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## A British Medical Association Lecture

ON

# UROGENITAL TUBERCULOSIS.

GIVEN TO THE SOUTH-WESTERN BRANCH

BY

C. A. R. NITCH, M.S., F.R.C.S.,

SURGEON TO ST. THOMAS'S HOSPITAL, LONDON.

THERE was a time when urogenital tuberculosis was regarded as a more or less hopeless disease, and the unfortunate sufferer was condemned to a life of misery interspersed with courses of tuberculin, cod-liver oil, and sanatorium treatment, until, worn out by painful and frequent micturition, and wasted to a shadow by toxaemia, death put an end to his sufferings.

Within recent years research in the laboratory and in the *post-mortem* room has revealed the true pathology of the disease, and this knowledge, combined with the perfection of the cystoscope, has enabled the clinician to make an accurate and often an early diagnosis, and by means of active surgical treatment to give the patient a good prospect of complete recovery. But even now the ultimate mortality is still too high, and the reason is not far to seek. Successful treatment in this, as in all other diseases, depends on an early diagnosis, but unfortunately very few cases reach the surgeon before the signs and symptoms are unmistakable. Therefore, at the outset I want to emphasize the importance of a thorough clinical and bacteriological examination in all urinary cases, particularly those with intermittent bladder irritation and so-called cystitis. The following is a case in point.

A stout, healthy looking woman, aged 49, dislocated her shoulder; a week later micturition suddenly became frequent and painful. This was diagnosed as cystitis, treated with an alkaline mixture, and soon subsided. A recurrence four weeks later led her to seek further advice. Cystoscopy revealed slight congestion around the right ureteric orifice. Both ureters were catheterized. Urine from the left was normal; that from the right contained a few pus cells and a number of tubercle bacilli. The right kidney was removed and found to contain a small tuberculous focus in its lower pole. Six years later she was in perfect health and the urine was normal.

In discussing urogenital tuberculosis it is most convenient to commence with the kidney, for disease of this organ forms a large proportion of the cases of urinary tuberculosis; also a lesion in the kidney is very commonly the primary focus from which the lower urinary and the genital tracts are directly infected.

### RENAL TUBERCULOSIS.

It is now well known that tubercle bacilli reach the kidney from some other focus in the body, either a quiescent and obscure lesion such as a tuberculous mediastinal gland or an active and obvious source such as pulmonary, articular, or osseous tuberculosis. These two sources of infection, generally speaking, give rise to two distinct clinical and pathological types of renal tuberculosis, called surgical and medical respectively. Though this is the usual rule, statistics show that in about 25 per cent. of cases the surgical form is secondary to *active* pulmonary and pleural tuberculosis.

*Surgical* or chronic renal tuberculosis was once thought to be primarily unilateral, but animal inoculation has now shown that a few early cases are bilateral. It is characterized by caseation, ulceration, and slow but progressive destruction. The urine contains tubercle bacilli, pus cells, caseous material, fragments of renal tissue, and a small trace of albumin of pyogenic origin.

The *medical* form is bilateral, the renal parenchyma is studded with miliary tubercles and the urine is clear, containing a few bacilli, many hyaline and granular casts, and a large trace of albumin. It is accompanied by typical physical signs of chronic nephritis and often ends in uraemia. Therefore the presence of tubercle bacilli in the urine does not necessarily imply that surgical treatment is required, but it does call for a careful and exhaustive examination. A kidney urine containing tubercle bacilli *and* pus cells demands immediate surgical treatment.

It is difficult to account for the two widely different pathological types, but probably the difference is only one of degree. In the miliary or medical form bacilli and toxins from an active lesion such as pulmonary tuberculosis are constantly passing through the kidney. Many of the bacilli are undoubtedly excreted in the urine, but eventually their escape is prevented by endarteritis and chronic nephritis; they therefore lodge in the glomerular zone and give rise to multiple tubercles. At this stage death takes place before caseation and liquefaction can occur. In the surgical form the kidney receives from a quiescent focus an occasional tuberculous embolus which becomes isolated by a barrier of protective inflammation. This is followed by the formation of a tuberculous abscess which either increases at the expense of the surrounding parenchyma or discharges into the renal pelvis.

### CHRONIC RENAL TUBERCULOSIS.

As the miliary form is part of a general disease, and so not amenable to surgical treatment, my future remarks will apply to chronic or surgical renal tuberculosis.

#### *Paths of Infection.*

Tubercle bacilli reach the kidney either by the blood stream or by the lymphatics, and of these two routes the haematogenous is undoubtedly the commoner. The exact site of the initial lesion in the kidney is disputed. The peculiar arrangement of the intrarenal arteries favours a cortical lesion, but clinically, though many tubercles are seen in the cortex, the grossest lesion is nearly always at the base of a papilla.

The lymphatics are considered by some to be the means of infection in those cases which are secondary to quiescent pleural and pulmonary tuberculosis. The bacilli are thought to be carried in the lymphatics passing through the diaphragm by a retrograde current set up by pleural adhesions. Though primary lymphatic infection is doubtful, secondary infection may be conveyed from a diseased to a healthy kidney by the communicating channels between the two renal plexuses, or from an ulcerated bladder by the peri-ureteral lymphatics.

Ascending infection up the lumen of the ureter does not occur. Animal experiments by English and Continental workers have proved (1) that pyogenic and other organisms placed in the bladder cannot pass the normal uretero-vesical valve, and (2) that when pyogenic organisms are injected into the ureter and pelvis the renal papillae prevent their entry to the kidney.

An ascending infection can only occur when the mucous membrane of the bladder or ureter is damaged, and it then travels in the wall of the ureter or in the peri-ureteral lymphatics. In all probability ascending tuberculous infection seldom occurs, for even when all the essential factors are present in the form of advanced genital and vesical tuberculosis the blood stream as a vehicle can never be discounted.

The pathological anatomy of the disease is so intimately connected with its clinical aspect that a brief description is essential for a proper understanding of the symptoms and treatment. Three types are recognized.

I. *Primary closed parenchymatous tuberculous nephritis* consists of one or more encapsuled foci in the parenchyma which progress to caseation and abscess formation and ultimately destroy the whole kidney. This is accompanied by an interstitial inflammation of the pelvis and calyces, ending in the formation of fibro-fatty tissue which fills the pelvis and excludes a portion or the whole of the kidney and its tuberculous products from the urinary tract. This process is called spontaneous cure, or auto-nephrectomy. The term is misleading, for it suggests that the disease is arrested or removed, but this is not the case. The bag of fibro-fatty caseous material never disappears; it may remain inert for years, but sooner or later the disease either invades the perinephric tissues or is disseminated to other parts of the body through the blood stream. The clinical signs of this condition are characteristic. In its early stage the urine of the infected kidney is increased in quantity, its specific gravity is lowered, and it contains a trace of albumin and a few pus cells. It is sterile and seldom contains tubercle bacilli. The renal function is

defective when compared with that of the opposite side. As destruction and exclusion progress the secretion of urine diminishes and finally ceases. The patient complains of frequency and vesical irritation, which is often diagnosed as mild cystitis and treated medicinally.

II. *Primary open tuberculous pyelonephritis* is characterized by ulceration of the pelvis combined with progressive destruction and ulceration of the papillae and parenchyma. There may be deeper lesions and miliary tubercles in other parts of the kidney, but the condition is essentially a tuberculous pyonephrosis. The changes spread down the ureter, its mucous membrane becomes ulcerated and its walls thickened. Its vesical orifice is wide open and dragged out, and the surrounding mucosa is ulcerated and sometimes studded with tubercles. The clinical picture is one of painful frequency (pollakiuria) with pyuria and occasional haematuria. The urine from the affected side contains pus, caseous material, renal elements, blood cells, and tubercle bacilli in large numbers. Often the efflux from the ureteric orifice resembles tooth-paste emerging from a collapsible tube.

III. The third type consists of a combination of the open and closed varieties. Its clinical features are similar to those of the second type.

### *Clinical Signs.*

The clinical signs seldom indicate the extent of the lesion. The affected kidney may be enlarged, irregular, and tender, but enlargement is unusual. The ureter is often thickened, and can be readily felt as a firm, round, tender cord on bimanual examination—rectal in the male and vaginal in the female. It is unfortunate that thickening of the ureter should have come to be regarded as a diagnostic sign of renal tuberculosis, for it indicates long-standing disease. It is to be hoped that in the near future an accurate diagnosis of the renal lesion will be made long before the ureter has become thickened. The opposite kidney is very often enlarged and tender from compensatory hypertrophy and toxic nephritis. In this context it is interesting to note that the urine from the healthy kidney often contains albumin, which disappears after removal of the diseased kidney.

Cystoscopic examination may show the bladder to be inflamed and ulcerated, or the trigone alone may be congested. The appearance of the ureteric orifice is often the only visible sign of the hidden focus in the kidney. It may be congested or oedematous, or surrounded by minute bullae. There may be tubercles on its lips, or it may be surrounded by a ragged ulcer with tubercles on its margins. In long-standing cases the orifice is wide open, rigid, and ulcerated, and when there is much thickening and fibrous contraction of the ureter the bladder is dragged out, forming a small hollow cone with the ureteric orifice at its apex. The efflux may be forcible and clear, or turbid, or even putty-like, when it appears like a worm-cast, which curls up as it is ejected and falls to the bottom of the bladder. When the orifice is open and rigid, turbid urine trickles out in a slow, continuous stream, or a ragged mass of caseous material is slowly forced out. Absence of efflux indicates obstruction of the ureter by caseous material or complete exclusion of the kidney.

### *Symptoms.*

The symptoms are essentially those of cystitis—pain, frequency, pyuria, and occasionally haematuria. They commence gradually and increase steadily. Sometimes the onset is sudden. This is due to the escape of tuberculous products from a focus in the kidney which has suddenly ruptured into the pelvis, giving rise to bladder irritation and frequent passage of turbid acid urine. In a few days the cavity in the kidney closes, the symptoms subside, and both patient and practitioner are lulled into a false sense of security. After an interval, during which the cavity refills, the process is repeated and the symptoms recur. These intermissions may last for months or years, the intervals of freedom becoming progressively shorter, until finally the discharge from the kidney becomes continuous and the lower urinary tract grossly diseased.

*Pain.*—The kidney may ache, but it is seldom painful. In rare instances there are definite attacks of colic, due to the passage of caseous material or blood-clot. In some cases pain is felt only in the healthy kidney, when it is probably reflex, for it disappears after removal of the diseased organ. The pain of cystitis is felt at the neck of the bladder, along the urethra, and in the perineum.

*Frequency* is at first due to trigonal irritation and later to cystitis. In the beginning it is diurnal only, soon it becomes nocturnal as well, and finally merges into total incontinence. Nocturnal frequency is one of the most constant and important symptoms of the disease.

*The changes in the urine* have already been described, but there are certain features which require further consideration. Polyuria, due to a defective renal function, is present from the commencement, and is replaced by oliguria as the kidney is destroyed. Albuminuria can be accounted for by pus and blood from the diseased kidney and by toxic nephritis on the opposite side. In the latter case it is often associated with hyaline and granular casts. Haematuria is a variable symptom. A profuse haemorrhage may be the first indication of the disease; as destruction progresses there may be slight haemorrhages at long intervals, or there may only be an occasional microscopic trace of blood.

The presence of tubercle bacilli in the urine is, of course, the only definite diagnostic sign. When found in a clear urine they are either being excreted by a normal kidney or by one containing miliary tubercles, but when a urine obtained by catheterization of the ureter contains both tubercle bacilli and pus cells there can be no doubt that the kidney is the seat of a surgical lesion.

When a secondary infection is present colon bacilli and other pyogenic organisms may be found in the urine, and may mask the true nature of the disease. The smegma bacillus should not cause an error in diagnosis, for it can now be identified by careful staining. Its presence is due to faulty collection of the specimen.

### *Diagnosis.*

Bladder irritation, nocturnal frequency, and the passage of hazy or purulent acid urine in a subject between the ages of 20 and 40 are strongly suggestive of tubercle.

The abdomen, lungs, lymphatic glands, and in the male the epididymes, prostate, and seminal vesicles, must be carefully examined. Tuberculous deposits in the genital tract are not necessarily primary infections; they may quite well be secondary to renal tuberculosis. Specimens of bladder urine must be examined both bacteriologically and microscopically by a competent pathologist. If tubercle bacilli are not found, even after repeated examinations, the diagnosis is still in doubt.

The next step should be a cystoscopic examination. Prior to this a dose of urea (for Maclean's urea concentration test) or an injection of indigo-carmine should be administered to enable the surgeon to ascertain the function of the kidneys. The appearance of the bladder and ureteric orifices is carefully noted. If the two orifices are similar in appearance both are catheterized and the urines collected. The renal function is estimated from a portion of these specimens, and the remainder is examined for tubercle bacilli, pus cells, etc. In doubtful cases guinea-pigs are also inoculated. If one ureteric orifice is obviously tuberculous the opposite one alone is catheterized; should its urine contain the slightest trace of pus a guinea-pig should be inoculated and the result awaited before the kidney can be declared healthy.

### *Treatment.*

As surgical renal tuberculosis is primarily unilateral, and as spontaneous cure is unknown, the treatment can be summed up in two words—early nephrectomy. Before an operation is performed the function and condition of the opposite kidney must be carefully investigated. The diseased kidney and any adherent fat should be removed by the lumbar route. It should never be incised to verify a diagnosis which should have been certain before the operation, otherwise the surrounding tissues will be infected and the wound take months to heal.

In bilateral cases where the disease of one kidney is slight the grossly infected one should be removed, for nephrectomy relieves the bladder symptoms and may benefit the remaining kidney by increasing its congestion.

Nephrectomy is contraindicated (1) when the function of the opposite kidney is defective; (2) in advanced bilateral tuberculosis; (3) in slight bilateral tuberculosis; (4) when the disease is secondary to pulmonary or other gross tuberculous lesions.

*Treatment of the Ureter.*

When the ureter appears healthy it may be ligatured in two places, injected with pure phenol, and divided a few inches below the kidney. When it is thickened or much enlarged and dilated total ureterectomy is advisable, for high division may be followed by a tuberculous sinus or a urinary fistula. The operation I perform in these cases is nephro-ureterectomy through a lumbar and an inguinal incision, the ureter being divided at the base of the bladder and removed, still attached to the kidney, through the lumbar wound.

In most cases the wounds heal per primam, but occasionally in debilitated subjects, and particularly if the perinephric tissues are infected, there may not be the least attempt at healing, and after removal of the stitches the whole wound gapes widely open. This has happened to three of my cases, and in each the wound took more than a year to heal.

*Results.*

The operative mortality is about 2 per cent. Out of 100 cases which have survived the operation 60 will be cured and 40 will have persistent urinary trouble. Of these latter, 30 will die in from three to five years of tubercle of the opposite kidney or elsewhere in the body, and 10 will be left with either frequency alone or frequency and pyuria.

TUBERCULOSIS OF THE BLADDER.

Vesical tuberculosis probably never occurs as a primary lesion, but is always secondary either to renal tuberculosis, the infection reaching the bladder in the urine or from the walls of the ureter; to genital tuberculosis via the seminal vesicle and prostate; or, in rare instances, to tuberculous salpingitis by direct extension from an adherent Fallopian tube.

The infection tends to spread in a downward direction to the urethra and prostate and thence to the seminal vesicle and epididymis. When the walls of the bladder are ulcerated the infection may ascend to the kidney by the peri-ureteral lymphatics.

The tuberculous process, when secondary to renal disease, commences around the ureteric orifice, and on the base of the bladder when secondary to genital tuberculosis. Tubercles form in the submucous tissue, giving rise to raised hyperaemic patches in the mucous membrane, which tend to form superficial or deep ulcers, with a ragged shreddy base. As the ulcers deepen the muscular wall of the bladder is invaded, causing contraction and great diminution in the capacity of the viscus, and thus accounting for the distressing frequency and incontinence so typical of vesical lesions.

A diagnosis cannot always be made by examination of the urine, for in many cases tubercle bacilli cannot be found. In these cases tuberculous nodules in the genital tract or a thickened ureter, combined with the cystoscopic appearances, will solve the problem.

*Treatment.*

The immediate treatment is removal of the primary focus—either the kidney or the affected portion of the genital tract. When both renal and limited genital tuberculosis coexist the kidney and ureter must be removed first, and the genital tract operated on at a later date. Provided the patient is otherwise healthy the results of such radical treatment are often remarkably good. After removal of the primary focus the bladder will often recover without further treatment, but when the cystitis does not subside both general and local treatment are necessary.

General treatment consists of rest in bed, bladder sedatives, and tuberculin.

*Local Treatment.*—Instillation of many different chemicals has been advocated and employed, but they seldom have much effect, and their introduction into the bladder may lead to septic infection. In my experience surgical diathermy is the best form of local treatment, but if this cannot be obtained relief is sometimes given by instillation of either gomenol oil 20 per cent., or of iodoform (1 part) and guaiacol (5 parts) in sterile olive oil (100 parts). Diathermy is performed at intervals of three weeks with a catheterizing cystoscope, and the granulation tissue or ulcer is gently fulgurated. Fulguration relieves pain, diminishes frequency, and assists healing. Suprapubic cystostomy and drainage is not advisable, for it is difficult to perform on a contracted bladder, gives little relief, and is followed by tuberculous infection of the wound.

GENITAL TUBERCULOSIS.

Genital tuberculosis usually occurs between the ages of 20 and 45. The infection may be primarily haemic, when it can commence in any part of the genital tract; or it may be secondary to urinary tuberculosis, when it spreads by way of the prostate to the seminal vesicles and epididymes.

Clinical and experimental evidence shows that the primary focus is generally in the prostate or seminal vesicle, and statistics favour the seminal vesicle. Young of Baltimore, in a recent article, states that the seminal vesicle is affected in 83 per cent. of cases of genital tuberculosis, and that in a large majority of these the vesicle was the seat of the primary focus. The work of Macfarlane Walker and others points to the same conclusions.

With certain peculiarities the pathological changes are similar to those of tubercle elsewhere, and, as in the kidney, the foci may be closed or open. The prostate is generally more often infected from the urine or from the seminal vesicle than from the blood. Cold abscesses form and discharge into the urethra or rupture into the base of the bladder at the side of the trigone, leaving a ragged cavity which never heals. The lower end of the seminal vesicle is more often affected than the upper, but the whole tube may contain caseous foci and tuberculous "pus."

The character and sites of the tuberculous deposits in the epididymis and vas are of great interest, and point strongly to the infection of the epididymis being secondary to a primary lesion of the seminal vesicle or prostate. The earliest and also the oldest foci are found in the globus minor, whence extension takes place along the convoluted tubes to the globus major and finally to the body of the testis. Primary deposits in the globus major are comparatively uncommon, and are probably correctly regarded as haemic infections.

Thickening of the vas is most marked at its two extremities, the intermediate portion being often comparatively healthy. This intermediate portion often feels thickened, but the increase in size is due to surrounding inflammatory fibrosis and not to changes in its walls or lumen. In advanced cases deposits of caseous material are found throughout its length. Macfarlane Walker in his Hunterian Lecture (*Lancet*, February, 1913) showed that the thickening of the prostatic end of the vas was due to tuberculous infiltration of the perideferential lymphatics, which gradually diminished as the epididymis was approached, and that thickening of the testicular end was due to tuberculous deposits in its mucosa. He therefore considered that the clinical fact of the earliest lesions of the epididymis being in the globus minor was explained by extension of infection from a primary focus in the seminal vesicle or prostate by way of the perideferential lymphatics and a return in the lumen of the vas.

The conclusions arrived at by many clinicians that genital tuberculosis is secondary to a primary focus in the seminal vesicles are borne out by the results of simple castration, for 50 per cent. of such cases develop tuberculous epididymitis in the opposite side within a year or more.

The disease commences insidiously and progresses slowly. Though complete arrest is uncommon, there may be long periods of quiescence ending in increased activity and rapid extension. The prognosis is bad, owing to the frequency of relapses, the constant danger of extension to the bladder, and of dissemination to other parts of the body.

*Treatment.*

In advanced cases medical and general treatment is indicated, as surgery offers little prospect of cure, but when the disease is limited to the epididymis and seminal vesicle radical operation is indicated. It should consist of removal *en bloc* of the epididymis (or epididymis and testis), the vas deferens, the seminal vesicle, and when necessary a portion or the whole of the prostate. The operation can be accomplished through an inguinal incision by Loughnane's method, but if the prostate is involved Young's combined inguino-perineal method is necessary. Should the disease be secondary to unilateral renal tuberculosis the affected kidney must be removed first and the operation on the genital tract postponed to a later date.

In all cases tuberculin is of great value, but only after operation. In my experience it has not the least effect on well established urogenital tuberculosis, and should never take the place of surgery if removal of the disease is possible.

# An Address
## ON
# THE CONSTITUTIONAL FACTOR IN DISEASE.

DELIVERED BEFORE THE ULSTER MEDICAL SOCIETY,

BY

ARTHUR F. HURST, M.A., M.D.OXON., F.R.C.P.,

PHYSICIAN TO GUY'S HOSPITAL.

(*Concluded from p. 827.*)

### BLOOD PRESSURE AND CONSTITUTION.

DISCUSSIONS on abnormal blood pressure have in the past suffered from our ignorance as to what constitutes the normal. Stocks[21] has recently investigated the blood pressure of 1,323 English boys, and the extensive investigations of Alvarez[22] and his colleagues on 6,000 male and 8,934 female first-year students at the University of California have provided reliable figures for young adults. The statistics published by Symonds[23] of 141,840 applicants for insurance in an American company give additional data for all ages above 15, the smallest group (over 60) being no fewer than 1,889. In children there is a steady rise in systolic pressure from an average of 85 mm. at 5 to 101 mm. at 10 and 123 mm. at 15. Contrary to what might be expected, there is no rise with advancing years from 17 to 40, the average systolic pressure being 125 mm. in men and 115 mm. in women. After 40 there is a slow rise, the maximum average being 135 mm. for 60 and over, but there is no longer any difference between the sexes.

In healthy individuals of the same age, sex, and race considerable variations occur. Thus Alvarez and his associates found that among the students they examined 2.77 per cent. men and 11.74 per cent. women had a systolic blood pressure less than 105 mm., and 20.81 per cent. men and 3.75 per cent. women had a blood pressure over 140 mm. It is, of course, impossible to draw exact lines above and below which the blood pressure should be regarded as abnormal. For convenience I would suggest that hyperpiesia is present when the blood pressure is more than 25 mm. above the average normal for an individual's age and sex. This would give a limit of 150 mm. in men and 140 mm. in women up to the age of 40, and 160 mm. for both sexes at 60. According to this standard, 8.15 per cent. men and 3.75 per cent. women among the 15,000 healthy students examined by Alvarez had hyperpiesia.

No such sliding scale is required for hypopiesia. American writers generally take 110 mm. as the minimal normal figure, but Alvarez's investigations clearly show that this is too high. A preferable limit would be 105 mm. for men and 100 mm. for women. According to this definition it was present in 2.77 per cent. of the 6,000 men and 3.50 per cent. of the 8,934 women among Alvarez's first-year students.

There is no doubt that the tendency to hyperpiesia is hereditary. Long before the invention of the sphygmomanometer the familial occurrence of high blood pressure, apart from disease of the kidneys, was recognized, and it was well known that many members of successive generations of a family might die from such results of high pressure as cerebral haemorrhage and cardiac failure, associated with arterio-sclerosis and hypertrophy of the heart. The tendency to hypopiesia is probably inherited with equal frequency. The actual cause of the high or low blood pressure is quite unknown, though it is probably, at any rate in part, due to variations in the activity of such internally secreting organs as the suprarenal, the pituitary, and the thyroid glands.

I believe that hyperpiesia and hypopiesia should be regarded as constitutional conditions or diatheses, being simply extreme degrees of variation from the average normal. They are not diseases and need never give rise to symptoms, but an individual with either condition is apt to react in a special way to toxaemias and to mental and physical fatigue.

The diffuse hyperplastic sclerosis of the arteries, described by Evans as a constant pathological finding in hyperpiesia, is, I am convinced, a result, like the cardiac hypertrophy, of the constitutional high blood pressure, and not its cause. Clinically hyperpiesia may be associated with apparently perfectly healthy blood vessels, especially in young subjects before the pressure has become excessive.

*(a) Hyperpiesia.*

So much has been written on the subject of hyperpiesia since the classical analysis of the condition by Sir Clifford Allbutt that I have little to add. I think, however, that too much time has been expended in looking for some toxic cause, when in reality true hyperpiesia, as distinct from the high blood pressure secondary to chronic renal disease, is not a malady but a diathesis—a constitutional inherited condition. So far as I know, Dawson and Ryle[4] are the only recent writers who have laid much stress on this aspect of the subject. Ryle has pointed out that the stout, healthy looking, John Bull type of individual is generally the subject of hyperpiesia, which is not acquired but is inborn. Among his patients with hyperpiesia 62 per cent. were of this type, 18 per cent. of average build, 4 per cent. "lean and nervous," and 16 per cent. of poor physique. The question might arise whether the exceptions were really suffering from primary hyperpiesia; in the lean and nervous individual I believe that a high blood pressure is generally secondary to the mental state. I found during the war, in cases of functional hyperthyroidism associated with a high blood pressure, that simple hypnosis often resulted in an immediate fall, amounting even to 45 mm., when the state of anxiety in which the patient lived was temporarily removed. A boy of 16, recently under my care, had an acute attack of nephritis from which he recovered completely, except that the blood pressure remained constantly in the neighbourhood of 156 mm.; as his urine was normal, the blood urea not raised, and the urea concentration test gave a normal result when he came under my observation six weeks after the onset, I allowed him to get up, and told him that his prolonged stay in bed had at last cured him. The next day his blood pressure had fallen to 120 mm., and it remained at this normal level, the previous rise having apparently been due to continuous anxiety, although he always appeared cheerful enough, but bored at having to stay in bed.

The typical hyperpietic has certainly a hypersthenic habitus; he is well built, with broad shoulders and a short, deep thorax with wide costal angle; he has a ruddy complexion, and may be actually plethoric; he is often athletic, unless overindulgence in food and drink has led to a crippling degree of obesity.

Hyperpiesia is often an accidental discovery in an apparently healthy man of exceptional mental and physical vigour. But sooner or later symptoms appear, generally as a result of mental or physical overwork, prolonged worry, excess of food and drink and perhaps of tobacco, or an acute or chronic infection. In women symptoms may develop at the menopause.

The symptoms are generally not due to the high blood pressure itself, but to its effects on the blood vessels or heart. Thus arterio-sclerosis impairs the blood supply to various organs, such as the brain and kidneys, which become

functionally inefficient, though in the case of the latter the blood urea never rises to the extent it does in primary renal disease; the loss of elasticity of the arteries may render them incapable of withstanding the strain of the high blood pressure, so that retinal and cerebral haemorrhages and epistaxis may occur. In spite of its hypertrophy the heart may eventually be defeated in its attempt to maintain an adequate circulation against the great peripheral resistance; cardiac symptoms, such as dyspnoea and precordial pain, then develop. The only symptoms which may perhaps be directly due to the high blood pressure are headache and vertigo, though even these are often absent in people with a blood pressure exceeding 200 mm.

When symptoms once appear in people with hyperpiesia the prognosis is never good, as there is an ever-present danger of death from cerebral haemorrhage or cardiac defeat, though this may of course not occur for several years.

### (*b*) *Hypopiesia.*

Although hypopiesia—an abnormally low blood pressure occurring independently of any organic disease—is as common as hyperpiesia, much less attention has been paid to it. It may be defined as a constitutional and often inherited condition, in which the systolic blood pressure is permanently below 105 mm. in men and below 100 mm. in women, without recognizable cause, such as tuberculosis, circulatory failure, severe anaemia, hypothyroidism, or Addison's disease. It is often discovered accidentally in perfectly healthy individuals. Further investigation generally shows that they are of hyposthenic habitus—thin, slouching, with long and narrow chests and acute epigastric angle. They are rarely athletic, and they generally choose a sedentary occupation.

Though not actually ill, the hypopietic is rarely very well. His most common symptoms are undue liability to mental and physical fatigue and a general lack of endurance, which is often in striking contrast with the heroic efforts he makes to carry on in spite of his disability. He is often subject to headaches, especially in the occipital region, and to attacks of vertigo, and more rarely of palpitation and syncope. He is generally pale, though not anaemic, and suffers from cold extremities. These symptoms are most likely to arise as a result of mental and physical strain or some acute or chronic infection or toxaemia, which would either have had no effect or only a slight and temporary one in individuals with an average blood pressure.

Fisher[24] found that the mortality of 3,589 persons, aged between 16 and 60, accepted for insurance, who had a systolic blood pressure of 100 mm. or less, was 35 per cent. of the expected mortality according to the standard American tables, whereas the general mortality among those insured by the company was 80 per cent. of the expected rate. According to Muhlberg,[24] the medical director of another insurance company, a low blood pressure after the age of 50 without any obvious cause is the best criterion we possess that an individual will live beyond his normal expectancy.

### *Treatment of Hyperpiesia and Hypopiesia.*

People with hyperpiesia and hypopiesia should be made to understand that they are not suffering from a disease, but that a constitutional tendency has been discovered in them, which indicates the desirability of care in certain directions in order that the maximum of physical and mental efficiency may be attained and preserved. It would probably be wise, when possible, to avoid all reference to blood pressure, and it is certainly most undesirable that the patient should keep a record of its variations. The last few years have introduced a new type of hypochondriac, and blood pressure has become one of the favourite topics of discussion at tea-tables and in club smoking-rooms. I once spent an unhappy week at a large hotel in one of the British spas where hyperpiesia is treated; my fellow guests appeared to have no other interest than in comparing the variations in their respective blood pressures. I have often been consulted by patients, who looked and felt perfectly well, for "blood pressure," which they apparently thought was the synonym of a serious disease.

It is even more essential for the subjects of hyperpiesia and hypopiesia than for the average man to take adequate holidays. But whereas the hyperpietic should be taught to restrict his exercise within more moderate bounds than those to which he has probably been accustomed, the hypopietic should be urged to take as much exercise in the open air as he can without exhaustion, even if, as is often the case, he has in the past taken little or none. He will often find that a holiday in the Swiss mountains will make him more physically efficient than he had thought was possible, and he may become an expert in such sports as climbing in the summer and ski-ing in the winter, which are quite unsuitable for the hyperpietic. Whereas the hyperpietic should be strictly moderate in his consumption of tobacco, alcohol, and coffee, and should even give them up entirely if previously taken in excess, such restrictions are rarely called for with the hypopietic; a cup of black coffee and a pipe after dinner and an occasional half-bottle of champagne will materially help him to enjoy work which would otherwise require an almost intolerable effort. Restriction in the quantity of food, which should be as largely vegetarian as possible, for the stout and plethoric hyperpietic is essential, whereas the thin hypopietic should be urged to eat plentifully without restrictions as to the consumption of meat. For both types any source of infection should be looked for and treated. I have seen several hyperpietic patients, who had more than the normal percentage of haemoglobin, benefit greatly from periodic bleeding, though it did not appear to lower their blood pressure; when well marked plethora is present the application of deep *x* rays to the long bones may throw out of action sufficient red marrow to reduce the number of blood corpuscles to normal limits, and at the same time cause a definite fall in blood pressure. In addition to outdoor exercise, physical drill, especially directed to the respiratory and abdominal muscles, is very useful for the hypopietic, who may also derive much comfort from the use of an abdominal support.

## The Constitutional Factor in Asthma, Epilepsy, and Migraine.

Several years ago[25] I defined asthma as a condition in which that part of the vagal nucleus which controls the motor and secretory activity of the bronchi is abnormally sensitive to chemical, reflex, and psychical stimuli. The importance of this definition lies in the recognition of the sensitive bronchial centre. In the first decade of the present century many rhinologists were so impressed with the results of the nasal treatment of asthma that they were inclined to regard an abnormal nose as the sole etiological factor. More recently the work of a number of investigators in England and America and on the Continent has directed attention to the importance of specific hypersensibility to the proteins of bacteria, food, animal emanations, and pollens, and most of the recent literature of asthma would lead one to suppose that in this—the "toxic idiopathy" of Freeman—is to be found the whole explanation of asthma. Lastly, a few enthusiastic neurologists would regard asthma as always of psychological origin. Attacks of asthma may, in fact, be caused by a great variety of reflex and chemical stimuli, as well as occasionally by psychological stimuli, but only if the individual has the asthmatic constitution, which manifests itself in an irritable bronchial centre, this being the one essential factor in the pathogenesis of asthma. It was inherited in 49 per cent. of 1,129 cases collected from various sources, compared with only 7 per cent. of 115 controls, and it is interesting to note that an individual may inherit it and transmit it to his children, without ever having an attack of asthma himself owing to the absence of the three groups of exciting causes. Thus the paternal grandparent and uncle and maternal grandmother and aunt, but neither parent, of one of my asthmatic patients suffered from asthma.

The question of inheritance of asthma is complicated by the fact that a toxic idiopathy, though sometimes acquired, may also be inherited, either in the form of a general hypersensitiveness to proteins, or, much less frequently, in a specific form to a single protein. Asthma does not, however, necessarily occur in each individual

with a toxic idiopathy, as the asthmatic constitution may not be present. A toxic idiopathy will give rise to asthma, hay fever, urticaria, or angio-neurotic oedema, vomiting or diarrhoea, or vasomotor neuroses of various kinds, according to whether the individual affected has a bronchial centre, nose, skin, alimentary tract, or vasomotor centre which is abnormally irritable. Two of the conditions may be present together, or they may occur in different members of the same family; thus asthma is frequently associated with hay fever and sometimes with urticaria, and a family history of hay fever is common among asthmatics, and vice versa. Just as an inherited asthmatic centre may be present in an individual who never gets asthma, though he may transmit it to his children, so a toxic idiopathy may be transmitted by an individual who is otherwise so normal that he never suffers from its effects. As toxic idiopathies give rise more frequently to asthma than to any other condition, it seems probable that the asthmatic constitution is one which is particularly likely to develop such idiopathies.

The clinical picture presented by the other most important paroxysmal neuroses—epilepsy and migraine—resembles asthma so closely in certain respects that the question of their relation with each other requires consideration. Epilepsy depends upon the presence of a constitutional and often inherited excitability of some part of the nervous system, which responds to certain stimuli by the production of an epileptic attack. The nature of these stimuli is, however, quite unknown in the majority of cases; the most important is perhaps chemical in nature, but there is no evidence to support the theories that intestinal intoxication or toxic idiopathies play any part. Reflex and psychical stimuli also occasionally give rise to attacks, but they are of comparatively small importance. A family history of epilepsy in an asthmatic or of asthma in an epileptic is so uncommon that, when it occurs, it cannot be regarded as more than a coincidence, and I have only seen one case in which asthma and epilepsy occurred in the same individual.

Migraine also depends upon a constitutional and frequently inherited irritable focus in the brain, which gives rise to headache, disturbances in vision, and gastric symptoms; there was a family history of migraine in 30 out of Bramwell's[26] 54 cases (55.6 per cent.). In migraine the usual stimulus is ocular, and a very thorough investigation in numerous cases under my care has invariably failed to reveal anything in the nature of alimentary toxaemia, hepatic insufficiency or a toxic idiopathy, which could be held responsible, in spite of the fact that on theoretical grounds these have frequently been suggested as the exciting cause of attacks. The evidence of a psychological origin is also quite insufficient except in rare cases, in which, however, eye-strain also invariably plays a part. I have only met with one case in which migraine and asthma were associated in the same individual, and there is no evidence that they occur together in the same family more than would be expected from the frequent incidence of both conditions among the general population. The same is true with regard to the association of migraine and epilepsy, so that it may be concluded that the constitutional basis of asthma, epilepsy, and migraine, though somewhat similar in nature, is in each case specific, and that no one of these conditions in a parent predisposes to the development of either of the other two in the children.

Long ago, in discussing the treatment of the constitutional basis of asthma, I said that the only cure of asthma is not to have it. The same is true of epilepsy and migraine. The longer a patient can be kept free from attacks by any form of treatment, the less irritable his abnormal nerve centre becomes, though it is doubtful whether the constitutional hypersensitiveness is ever entirely lost in asthma or epilepsy, though with advancing years the complete cessation of migraine attacks is not uncommon. A patient of mine, who had been free from asthma during a residence of twenty-five years in South Africa, developed an exceedingly severe attack on his return to his home in England, where as a boy he had been almost constantly asthmatic. I have known many epileptics relapse directly they gave up taking bromide, which they had been told they could discontinue after they had been free from attacks for one, two, or three years. It is true that the liability to attacks steadily diminishes as the period of freedom lengthens, but I am inclined to think that nobody who has once suffered from epilepsy should ever discontinue the use of small doses of bromide or luminal, even if he remains free from fits for five or ten years. Kinnier Wilson has recorded the case of a lady who had only two attacks in her life, the interval between them being no less than thirty years.

Conversely, the more attacks an individual with asthma, epilepsy, or migraine has, the more irritable his centre becomes. An asthmatic develops the status asthmaticus, in which the treatment he usually employs for an attack fails to help; nothing will then relieve him until he has moved to some more favourable surroundings, where rapid recovery will generally take place.

The *faiblesse irritable* of the nervous system, which is the ordinary sequel of mental and physical fatigue, increases the constitutional irritability of the nervous centre upon which the paroxysmal neurosis depends. Consequently it is of the utmost importance for individuals who are subject to asthma, migraine, or epilepsy that the work of each day should be limited in duration, that the week-end should be sufficiently restful, and that two annual holidays of adequate duration should be taken. This is particularly important in the case of asthma and migraine, both of which tend to occur in people whose mental capacity often leads them to adopt a career in which overwork is likely to occur.

Unfortunately there is no drug which exerts a favourable influence on the constitutional factor in asthma comparable with that of luminal in epilepsy and migraine and of bromide in epilepsy. Climate has, however, a remarkable effect, quite apart from the influence of vegetable and animal emanations which may render one place unsuitable to some asthmatics without having any effect on others. Thus asthma hardly ever occurs among the permanent residents of the Swiss mountains, and many asthmatics who, in spite of the greatest care with regard to diet, the avoidance of fatigue, and other exciting causes, have asthma more or less continually whilst at home and are unable to take any active exercise or even walk upstairs without dyspnoea, become entirely free within a day or two of their arrival in the mountains, where they can climb all day in summer and ski or s'ate in winter without respiratory distress. That the climate exerts a specific influence in diminishing the irritability of the bronchial centre is shown by the fact that chemical and reflex stimuli, which would cause violent attacks at home, no longer produce the slightest ill effect. This is perhaps one of the strongest arguments against those who regard nasal abnormalities or toxic idiopathies as the only factor worthy of consideration in the pathogenesis of asthma and entirely neglect the essential constitutional element in the disorder.

No child should be allowed to go to school or spend his holidays in a place where he is asthmatic. I knew an Eton boy whose home was in London and who was always in the status asthmaticus whilst at school; this could be interrupted by sending him to Paddington Station for a few hours, but returned as soon as he got back to Eton. If he had stayed at Eton the constitutional basis of the disorder would have been so firmly established that the prospects for the rest of his life would have been seriously affected. He was removed on my advice, and is now at a school where he has no asthma.

In the comparatively rare cases in which it is impossible to find a place in England where a child is free from asthma, and where rhinological, immunological, and other treatment has failed to give relief, a year's residence in the Swiss mountains is likely to save him from becoming a permanent invalid. The removal of chemical and reflex causes is likely to be futile if the constitutional element of the disease is neglected; such treatment is always most effective if carried out during a period of comparative or complete absence of symptoms.


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# "GASTRIC ATTACKS" IN CHILDHOOD.*

BY

DONALD PATERSON, M.B., M.R.C.P.,

PHYSICIAN FOR THE DISEASES OF CHILDREN, WESTMINSTER HOSPITAL; PHYSICIAN TO OUT-PATIENTS, THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET.

THE usual age at which gastric attacks occur in childhood is between 2 and 7 years, probably most commonly between 5 and 6. By "gastric attacks" I mean a train of symptoms which points to the alimentary tract as the seat of the disturbance. Thus a child aged 3 refuses his tea, seems fretful, out of sorts, a little feverish, and alarms the household by vomiting, during the evening, some of the food taken at his dinner. The doctor is summoned in the morning, finds his patient with a temperature and a dirty tongue, drowsy, irritable, and still refusing food. In the course of the next few days recovery takes place. The picture varies enormously, depending on the underlying cause and on the particular child. Thus the child may show a very slight disturbance and be nauseated only. Again, the vomiting may be profuse, the bowels may be obstinately constipated with pale motions, or there may be profuse diarrhoea.

The common causes of gastric attacks are, in my opinion, (*a*) infections in the alimentary tract or elsewhere; (*b*) dietetic errors; (*c*) overexertion and excitement. There seems no doubt that the first is far and away the commonest.

### *Infections.*

The so-called cyclical vomiting attacks (to be discussed later), where the condition recurs over and over again at more or less regular intervals, may be closely simulated by recurrent tonsillar infections. Thus a small child with acute tonsillitis may make no complaint, but refuse its food, become feverish, drowsy, irritable, and through the presence of acetone bodies, formed as a result of the infection, complain of nausea, or vomit. The tonsillar infection may, directly or indirectly, affect the liver, so that the old term "chill on the liver" would aptly describe the situation. On the other hand, the stomach or bowel may be infected, secondarily to this tonsillitis. Careful inspection of the throat should always be made in every "gastric" case. The removal of tonsils should be advocated if such cases should show a tendency to recur.

In thin, nervous, dyspeptic children, especially little boys, and particularly only children or the youngest in the family, catarrhal infections of the nasopharynx or chest may precipitate the condition described, so that the gastric symptoms completely dominate the picture. In girls chronic pyelitis should always be thought of. In these cases, a number of which I have recently been studying, bouts of mild fever occur at more or less regular intervals of two, three, or four weeks. Examination of the urine between attacks may show surprisingly little pus, but during the febrile attack much pus appears. A catheter specimen, both during and between attacks, shows the presence of the infecting organism on culture (as a rule *Bacillus coli*). But the indications for obtaining such a specimen between attacks are not definite, and the result is that cases are missed. During the attack the presence of pus is masked by urates and phosphates, and it is only by the microscope that the real condition of affairs can be ascertained. The bouts of fever are accompanied by drowsiness, lassitude, anorexia, and, if food be pressed, by nausea and vomiting. The result is that they become known in the family as "gastric attacks."

During the influenzal season gastric attacks are common and receive the name "gastric flu." In such cases the onset is extremely sudden, the vomiting is often accompanied by diarrhoea, and there is little doubt that the mucous membrane of the alimentary tract is the direct site of the infection.

### *Dietetic Errors.*

At this age slight variations in diet will not produce gross symptoms in the average child. We should not therefore commence an examination of such a patient with the thought in our mind that he has only probably overeaten. It is true that such may be the case, but I believe only in a minority of cases; infections are the predominating cause. There is a type of child who appears to have an inherited inborn tendency to "liverishness." His mother or father was liverish as a child, and may exhibit train or tram sickness or headaches in adult life. Their child is termed the "nervous child," and most often he is found to be their only offspring. This little fellow—for as a rule it is a boy—gets recurrent gastric attacks at more or less regular intervals throughout the year, becoming less and less frequent as he approaches the school age. A consideration of his diet shows that he tends to be overfed on milk, cream, and eggs, and the overanxious mother, seeing his frail little body, plies him with what she considers the most nourishing food. The treatment of such a case is obviously the reduction of fats. Cream must be abolished, eggs and milk reduced to a minimum, certainly not more than two eggs in the week or half a pint of skimmed milk in the day. To metabolize what little fat he gets a maximum of carbohydrate must be given, and this can best be done by offering barley-sugar, jam, golden syrup, treacle, or honey at the end of the mid-day and evening meals. A régime must be adopted whereby three meals only are given and nothing allowed between them. Instead of the child losing weight on this apparently scanty diet he will, paradoxical as it may seem, rapidly put on weight.

In my opinion the error of overfeeding on fat as above described is by far the commonest dietetic error made.

The clinical picture of the above case may show some of the following features. For twenty-four hours the child appears to take his food extraordinarily well. The following day he is irritable, drowsy, and yawning with anorexia, and this is followed by a sudden onset of violent vomiting, when even sips of water are returned. Cramps and colicky pains about the navel occur next, and the parents fear the onset of appendicitis. The abdomen, however, is not tender, and is inclined to be flat. The bowels, as a rule, are constipated, and the urine is filled with acetone and diacetic acid. The management of the attack should commence by getting the bowels to move. Small doses of calomel (1/6 or 1/4 grain) should be given with 5 to 10 grains of sodium bicarbonate hourly until the bowels move. Glucose water and sweetened drinks of fruit juice should be given in sips. As a rule, with the opening of the bowels the vomiting ceases, and drinks of water should then be pushed, when recovery will be rapid. Single isolated bilious attacks due to gross indiscretions of diet are likely to occur in any normal healthy child, and may simulate this picture; the treatment is identical.

### *Overexertion and Excitement.*

In examining the child with a gastric attack we should ascertain whether previous attacks have occurred, and having excluded infection and gross dietetic errors the possibility of overexertion being the cause should be considered. It would appear that a certain proportion of the available blood sugar is required for fat metabolism. With great mental and physical exertion—so that the child becomes overtired—the available supply of sugar is deficient for fat metabolism and the general body nutrition. An attack of vomiting or nausea occurs, very similar to those attacks of hypoglycaemia seen in the diabetic subject who has been given an overdose of insulin. In one such child, observed by Graham Ross in America, an attack could be precipitated at will by such means. Most adults can recall the faintings, giddiness, or nausea felt by them as children on some occasion when they went to school without breakfast. This, if slightly exaggerated, may easily develop into a so-called gastric attack.

I have not touched on the rarer causes of gastric attacks, such as food poisoning, nor have I mentioned those children who show violent vomiting and profuse diarrhoea at the onset of acute infections, such as scarlet fever, measles, or pneumonia; nor have I mentioned typhoid fever or dysentery, which ought always to be borne in mind. Comparatively speaking, these cases are uncommon, and those I have mentioned should be thought of first.

* A lecture given to the Chelsea Division of the British Medical Association.

*Diet.*

A diet suitable for a boy of 5 or 6 who tends to have liverish or gastric attacks at intervals should be along these lines. On waking he should have a glass of orange, grapefruit, or grape juice, sweetened with four lumps of sugar. Breakfast, half an hour to an hour later, should consist of some cereal, such as porridge, groats, cream of wheat, puffed rice, or shredded wheat, with a very little milk but well sweetened with sugar. As a second course, on two days in the week he may have an egg, and on four days, crisply done, very thin rashers of bacon, which should be fried until the fat has been mainly removed and allowed to drip, so that a minimum of grease or fat remains. Fish should be given on one or two mornings. Crisp toast and butter with freshly brewed tea or Horlick's malted milk, or well skimmed milk and water, equal parts, one cupful only, complete the meal. Nothing should be given all the morning. For dinner—and it is best to have early dinner with these children, say at 12.30—fresh mince or stew, underdone beef or steak or cutlet, should be given on four days in the week, with chicken or fish or brains on three days. A small portion is sufficient. Potato and green vegetables, a tablespoonful of each, should also be given. Milk pudding or stewed fruit, but not suet pudding, should follow, and the child should have water to drink. At tea —4.30 to 5 p.m.—thin bread-and-butter or crisp toast, with stewed fruit, jam, treacle, honey, golden syrup, or a little milk pudding, may be given. The drinks should be the same as at breakfast. In winter a bowl of soup may be taken at this meal.

The child should not have an excess of eggs or cream, much creamy milk, pastry, or suet pudding, chocolate, or cocoa.

## GENERAL MEDICAL PRACTICE AND THE MEDICAL CURRICULUM.*

BY

J. M. MUNRO KERR, M.D.,

REGIUS PROFESSOR OF MIDWIFERY IN GLASGOW UNIVERSITY.

You can readily understand that my return to this classroom as Regius Professor awakens many memories—memories of undergraduate days of almost unalloyed happiness, and later memories of early essays as a teacher during the years when I was assistant to Professor Murdoch Cameron, who had succeeded to the chair in 1894. The decade immediately preceding this year was most eventful, not only in surgery but also in obstetrics and gynaecology. It witnessed the birth of surgical obstetrics and gynaecology. Quick to recognize this development, more especially as it affected obstetrics, Professor Cameron introduced into the Glasgow Maternity Hospital the modern operation of Caesarean section which Sänger of Leipzig had evolved in the early eighties. The successes he secured and reported focused the eyes of the obstetric world on the school of Glasgow. I feel sure you desire to be associated with me in wishing Professor Murdoch Cameron many years of enjoyable leisure.

In selecting a subject for the inaugural address which use and wont prescribe, my chief difficulty was in deciding whether to review the past or forecast the future. I have chosen the latter, for to forecast the future is one of the few adventures left to the middle-aged. Besides, there is a certain fitness in the choice, because to you the future is everything. It occurred to me, therefore, that as most of you will ultimately embrace the arduous but very honourable calling of general practice it might be of interest if I placed before you the future of general practice as I see it, and the manner in which the medical curriculum might be modified to suit the changing conditions which are slowly but steadily occurring in general medical practice.

* Inaugural address (abbreviated) delivered on January 10th, 1927, on appointment to the Regius Chair of Midwifery in Glasgow University.

We have reached a very important stage in the evolution of medical education. For many years the general trend of medical education has been along certain simple lines—namely, as knowledge in a department has advanced the policy followed has been increased instruction in the subject or subjects of that department, with the result that the student of the present day finds it impossible to digest the mental food provided. As a remedy it has been suggested to lengthen the curriculum; and when we consider the length of the medical curriculum in other countries as compared with ours—take Sweden as an extreme example with its eight to nine years—this policy might appear justifiable. But before adopting such a policy—which to those responsible for medical education is the easiest way out of the difficulty but to the student a most serious one—it will be advisable to consider whether some rearrangement or modification of the curriculum is possible.

It is conceivable that with the altered conditions as regards medical practice modifications in the curriculum might in great part get over the difficulty. This implies a correct forecast of the trend of general medical practice. Until this is determined it is impossible to decide how the curriculum should be altered to suit the requirements of the young graduate of to-day who is ultimately going to practise his profession as a general practitioner.

The future of general medical practice lies more and more in the direction of pure medicine, and the general practitioner must be raised in pure medicine to a very high level. He, associated more intimately with the consulting physician, clinical pathologist, and officer of health, is the individual whose assistance will be of inestimable value in advancing medicine. For, as the late Sir James Mackenzie pointed out repeatedly, on the general practitioner must we depend for the early recognition of disease —the field of medicine which at the present moment offers the most promising harvest. Though this will ultimately be the vocation for the general practitioner, it does not mean that he will occupy a less important place in the community, nor that he will be less beloved than the old-time family doctor. The general practitioner as I see him will occupy a more important place, and incidentally he will have an infinitely more interesting professional life. He will be brought into closer relationship with the consulting physician, the clinical pathologist, and the medical officer of health, who also will benefit, for hospital, laboratory, and office work has a tendency to produce a mentality too academic and bureaucratic.

Looked at from yet another standpoint, this co-operation between these different departments is becoming necessary to the teacher of clinical medicine and his students, for, as you are well aware, a number of diseases have been relegated to special hospitals which the medical student only occasionally visits, and in which, therefore, he has few opportunities for clinical study.

Some months ago, in the pages of the BRITISH MEDICAL JOURNAL, I had the temerity to refer to this question of the trend of general practice. Let me quote a few lines from the editorial[1] on the subject:

"General medical practice is not, as a fact, developing on lines such as those which Professor Kerr indicates as, in his opinion, desirable. So far from restricting himself to pure medicine, afraid to use a knife or any other surgical instrument, shrinking from responsibility for a maternity case in any of its stages, ante-natal, natal, or post-natal, the general practitioner, in partnership or association with his fellows, is finding it useful to his patients and advantageous to himself to undertake an even wider range of service than was at one time customary; and the results justify the method."

I am quite prepared to admit that individual practitioners and firms of practitioners find this policy advantageous to themselves. But general surgery and the surgical specialties, including obstetrics, are crafts, and craftsmanship only reaches its highest level when individuals in addition to having a natural aptitude for craftsmanship have continuous practice in their craft. This is not possible in general practice, no matter how large the practice may be. Further, the development of general practice on the lines above indicated introduces an

atmosphere of commercialism into medicine which we must ever strive to avoid if our profession is to retain the respect and confidence of the public. Fortunately, it is doomed to ultimate failure, for the wealthier community will continue to employ specialists; while those of moderate means and the artisan class will also insist on the services of specialists. Interesting in this connexion is the following sentence from the Hippocratic oath: "I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners (specialists in this art)."

It is obvious that sooner or later some arrangement must be made to supply insured persons with advice and treatment in the various special departments of medicine and surgery. As a matter of fact, this has been done in dentistry and ophthalmology. Many of us remember the introduction of the National Health Insurance Act and the opposition it aroused. I have no hesitation in stating that this opposition and the behaviour of a certain number of the profession did great harm to the status of the profession in the eyes of the general public. Would these critics wish to see the Act repealed? There is no necessity for a similar controversy when the question of special treatment to insured persons is under consideration.

Having attempted to indicate the trend of general medical practice, let me now consider the medical curriculum. It is obvious that I cannot discuss this matter of the curriculum in detail. It is giving many of us much thought. Its importance is fully recognized by the General Medical Council, as evidenced by the fact that quite recently it asked for supplementary information and suggestions to the reports formulated by the different subcommittees of 1922.

The General Medical Council, if one reads the discussions and reports on the curriculum published, is far in advance of the times. It sees that radical alterations in the curriculum are necessary. But the conservatism of teachers generally, the vested interests of certain teaching bodies, and the jealousy of individuals regarding their particular subject are barriers to innovations which are very difficult to overcome.

Leaving aside for the present the purely scientific subjects and confining myself to the later clinical subjects, and more especially to obstetrics and gynaecology, let me indicate the training which I think suitable. In obstetrics the student should be trained to have a general conception of obstetric and gynaecological problems, and to be able to deal with ordinary deliveries. If he wishes to do more, he must have special post-graduate instruction and practical experience. The duration of this training need not be longer than three months, provided he gives up his whole time to the subjects of obstetrics and gynaecology. This was the recommendation of the Scottish subcommittee which dealt with this part of the curriculum in 1922.† And it is greatly to the credit of the Edinburgh school that it immediately adopted the recommendation. Another school which has adopted the principle as regards obstetrics and gynaecology is St. Thomas's Hospital. There Dr. Fairbairn, who directs the department, has followed the recommendation of the English subcommittee and established a six months' course, which includes not only obstetrics and gynaecology but also pediatrics. The reason for this longer course in St. Thomas's is that it, in common with many of the other London hospitals, has difficulty in providing sufficient clinical material for the teaching of obstetrics. Many American schools have arrangements somewhat similar, and in Sweden, which I visited last summer, a four months' course of concentrated teaching has been the arrangement for many years. Owing to the exigencies of obstetric practice it is only by such an arrangement that the student can be satisfactorily trained in obstetrics. Fortunately, in our school here in Glasgow we have abundant material and a large and well appointed hospital. What is necessary is that the clinical teaching should be better organized and that systematic lectures should be cut down by at least half.

This brings me back to the extent or type of the training in obstetrics and gynaecology, and it is interesting to consider what other countries are aiming at. There may be said to be two opposing camps—one which aims at an extended training and a very thorough experience in obstetrics, so that the young graduate may be able to undertake almost any operation in obstetrics; this is especially advocated in some of the schools of America. The other school views matters quite differently. Its policy is to train the undergraduate only to a moderate extent. This type of training pertains to such countries as France, Sweden, and Denmark. These countries are aiming at an obstetric practice carried on by particularly educated and well trained midwives, assisted in cases of difficulty and supervised by specialists or specially trained accoucheurs distributed over the country—in other words, the establishing of an obstetric service very much on the lines I suggested in the paper already quoted. My reason for supporting this latter arrangement is because it is impossible for the general practitioner to obtain continuous practice in obstetric operations. If we take Glasgow as an example, we find that some 60 per cent. of confinements are attended by midwives.‡ Further, there is an ever-increasing number of women who elect to go into hospital for their confinements. Thus the experience that practitioners of former generations gained in their private practice is not available to the practitioners of to-day.

The great fault of the present system is that the student is not "steeped" sufficiently in clinical work; and, let me remark, this clinical experience and training should be as thorough in the outdoor department as in the wards, because so many minor ailments and early phases of disease are only seen in the outdoor department. As a matter of fact, the old system of apprenticeship whereby the young candidate of medicine was associated with a practitioner and gained his clinical experience from actual practice was most useful, and nothing in the clinical training since that system was abolished has quite taken its place. We must get back in a different form to the idea of apprenticeship.

I have indicated the training in obstetrics and gynaecology—namely, a whole-time concentrated course of three months as a minimum. As regards medicine and surgery, I speak with less assurance. I am inclined to the opinion, however, that clinical training in medicine should be increased and that possibly clinical training in surgery might be lessened. The clinical training of the undergraduate in medicine is not sufficient for present-day requirements. Further, ophthalmology certainly, and possibly some of the other medical specialties, should be given greater consideration.

Surgery is on a very different footing. No one to-day attempts to practise surgery seriously without some special post-graduate training. The great surgical principles, the possibilities of surgery, surgical pathology—these are the subjects to which the medical undergraduate's attention should be directed. The craft of surgery can only be learnt after graduation. I venture to suggest to my surgical colleagues that the training of the undergraduate in surgery might with advantage be modified to suit the requirements of general practice of to-day. The same applies to the surgical specialties.

Each of us engaged in the training of medical undergraduates must seriously consider medical education, not solely as it affects his own particular department, but with a broad outlook on the position of present-day medical practice. We must not attempt, as some countries are doing, to train experts in medicine, surgery, and the specialties. With the foundation well laid in biology, chemistry, anatomy (modified), physiology, and pathology, exactness in clinical observation is the first essential, and this I maintain can be developed to the fullest extent in medical wards. Again, I maintain that medicine, with the medical specialties, is the ultimate calling of the general practitioner.

REFERENCE.

1 BRITISH MEDICAL JOURNAL, June 12th, 1926, p. 999.

† A subcommittee appointed by the Faculty of Medicine is at present considering the co-ordination of clinical teaching in the final year.

‡ Some districts of Scotland show 80 to 90 per cent. of confinements attended by midwives.

## THE PART PLAYED BY INJURY AND REPAIR IN THE DEVELOPMENT OF CANCER;

### WITH REMARKS ON THE GROWTH OF EXPERIMENTAL CANCERS.*

BY

PROFESSOR H. T. DEELMAN,

GRONINGEN.

CAN we demonstrate experimentally the reason for the very localized starting-point of a tumour, although a great number of epithelial cells had been in contact during days and weeks with the cancer-producing agent (tar in the case of the experimental tar cancer)?

Mice were tarred in the usual manner till some of the animals showed early papillomata. Under the microscope these tumours proved to be very localized epithelial hypertrophies. We know that in this stage of the experiment the skin of the mouse tends to form numerous tumours in a very short time when tarring is continued, but that if tarring is stopped at this stage only a very small number of tumours will appear. The tarring was stopped at this stage of the experiment and a few days afterwards incisions were made in the skin, care being taken to make them in places where no papillomata had appeared. These wounds very soon assumed an oval shape and healed in the normal time. There was first a layer of fibrin and dead cells, and under this material we very soon found the first symptoms of healing in the form of new epithelial cells. In the majority of cases we observed in the wounds —healed or partly so—new tumour processes. In some instances there were only two or three tumours in one scar, in others there were many more. I never observed that the whole scar was involved in the tumour process. Sometimes the tumour growths were so numerous that the scar could be localized with the greatest ease. I have said that the tumours appeared in some cases after the scar had healed and the new epithelial cells—that is to say cells never themselves in contact with the tar—produced in these experiments primary growths. We know there is a relation between tar and tumour formation; we now learn from these experiments that the liability to tumour formation can be transferred to daughter and granddaughter cells without the cells showing any change microscopically, nor in the biological sense. These tumours which we produced just at the place where we expected to see them were very malignant, and sometimes in a very short time the whole scar and the surrounding tissue were replaced by a typical cancer growth. We have thus an opportunity of getting a clearer insight into the local origin of tumours in a skin area where all the cells had been in contact with the cancer-producing material. Every now and then the animals get little wounds. These wounds may be so small that they escape attention. They heal as a rule very quickly, and we may suppose that some of them will produce a tumour in the same way as was shown in our experiments. In a very short time these tumours may be larger than the little (often almost invisible) scars from which they started. These experiments may have a general significance for the local beginning of a tumour.

Some other experiments throw a light on the old question of the manner of extension of a tumour. When we study the first beginning of a tumour we find a local hypertrophic growth. Somewhat later the surrounding cells hypertrophy also, and so on, until there exists on the skin a hypertrophic proliferation generally in the form of a papilloma. The way in which such a papilloma grows seems to indicate an influence of the central parts of the papilloma on the surrounding cells of the living organism, with the result that the latter also hypertrophy. At a later stage the central parts of the papilloma are changed into cancer cells, and we noticed that the cancer cells influenced the surrounding hypertrophic cells exactly in the same way as the hypertrophic cells had before influenced the surrounding normal cells.

These observations on the growth of young tumours, as was demonstrated in 1924 at the cancer congress in Strasbourg, bear out the old view of Virchow. It must be of great value to show in another way the influence of tumour cells upon the surrounding living cells of the organism.

In the first part of this paper I demonstrated that young (regenerating) epithelial cells, in certain circumstances, are very susceptible to tumour formation. On the strength of that observation I made the following experiment: Mice were tarred on the epilated skin until there appeared a few little papillomata, then we stopped applying the tar. A few days afterwards we made two little scarifications, one which was in contact with the tumour, the other at some distance for the purpose of control. We marked the position of these wounds by rubbing in Chinese ink, and after two or three days they were healed. Only a small black line under the new epithelium showed the place where the fine small scalpel had cut through the upper part of the skin. The little healing wound, which either touched the tumour or very nearly did so, showed some interesting changes. The whole mass of new epithelial cells in this wound changed into hypertrophic growth. We never saw in scars that were not in contact with a tumour changes of the same extent. There must be an influence of the tumour cells on the cells of the scar. We know that these cells were very liable to become neoplastic, and therefore it was possible to show this influence clearly. Just as we have seen in a papilloma, the surrounding cells were predisposed to hypertrophic, and afterwards real, tumour growth.

*Summary.*

1. Injury may have a direct influence on tumour genesis in an extensive area of epithelial cells that are susceptible to tumour formation.

2. Former experiments have made it probable that in the earliest stages of tumour formation the peripheral cells may have an influence on their immediate neighbourhood. When we effect contact between the youngest tumour cells and cells which we know are very susceptible to develop a tumour, then we can clearly see the direct influence of the tumour cells on the other cells of the organism.

It will be the purpose of cancer study to obtain a better insight into these intercellular activities.

* Read before the Royal Society of Medicine, Pathological Section, March 14th.

## SEQUELAE OF ENCEPHALITIS LETHARGICA:

### *NOTES ON 128 CASES.*

BY

CHARLES M. SMITH, M.A., M.D., D.P.H.,

CLINICAL OFFICER, PUBLIC HEALTH DEPARTMENT, GLASGOW.

DURING the spring and summer of 1924 there were under my care in Belvidere Fever Hospital, Glasgow, 143 patients suffering from encephalitis lethargica. Of 132 patients who were discharged from hospital, 128 were examined twice within a year at roughly six-monthly intervals.

*The Degree of Impairment.*

During the acute attack the cases were divided on a clinical basis according to the outstanding clinical feature—namely, lethargic, choreiform, myoclonic, psychotic, hyperalgesic, ophthalmoplegic. They were also classified according as the attacks were mild or severe, and these classifications were used to ascertain what correlation, if any, existed between the degree of impairment and the type and severity of the original attack. The results of examination a year after the attack are embodied in the following table.

| Group. | Type of Attack. | | |
|---|---|---|---|
| | Mild. | Severe. | Total. |
| I. Cases with no impairment ... ... | 37 | 12 | 49 |
| II. Cases with slight impairment (working or attending school, but with difficulty) | 28 | 13 | 41 |
| III. Cases with marked impairment (unfit for work or school) | 7 | 21 | 28 |
| IV. Cases with very marked impairment... | — | 10 | 10 |

It will be seen that there was a fair degree of correlation between the original type of attack and the degree of impairment that followed; that the mild cases more often recovered, and that the severe cases more often were impaired. It would also appear that a higher proportion of attacks with a "positive" bias—using Walshe's classification[1]—were followed by impairment, when compared with those of a "negative" character.

*The Two Main Types in Cases with Marked Disablement.*

Where the sequelae and degree of disablement were marked two classes could be recognized.

A. *The "Restless Naughty Child."*—In this class the most constant features are insomnia, nocturnal restlessness, asthenia, pallor, psychic changes, and tics. During the day the child is restless and fidgety, "constantly on the move," as the parents say. He is very often noisy, irritable, nervous and easily frightened, bad tempered, impudent, and lacking in respect.

One boy had on several occasions threatened to commit suicide; in the street he would address strangers with complete familiarity and frequently behaved in a cruel manner to his younger brothers and sisters. As tested by the Binet-Simon scale there was no impairment of intelligence, in fact, there was a tendency to precocity.

In the mental processes of these patients, however, a characteristic impairment is to be found. They cannot maintain concentration on any one subject for any length of time; it is as if the mind, like the body, partook of the general restlessness. At night they are very troublesome; they roll, turn and toss about in bed, stand up and stamp, spit, sing, whistle, shout, clap their hands, and make peculiar noises—grunting, "cheeping," clucking, and blowing. One boy wanted to sharpen something with a knife all night long. This continued to a late hour until exhaustion brought sleep which lasted until late in the following forenoon. In a boy it was reported that on alternate nights the insomnia was absolute, the entire night being spent in restlessness and excitement; in the intervening night he slept heavily for about twelve hours.

In the worst example of this kind, a boy of 6 years, there was a striking degree of precocity combined with very definite evidences of moral degeneration. At one time he contracted a habit of vomiting, and without effort or apparent feeling of sickness he could bring up mouthfuls of undigested food, which he would, if allowed, consume. He would also attempt to embrace everyone who came near. A year after the original infection he was in another hospital, and deterioration was so marked and he was so difficult to deal with that removal to an asylum was being contemplated.

Nineteen patients, most of whom were between 7 and 14 years of age, fall into this class of the "restless naughty child." The kind of attack which was by far the most productive of these sequelae was the severe choreiform type. Of a total of 35 children dismissed from hospital, 18, or 51 per cent., had developed these changes.

B. *The Parkinsonian.*—A feature of the Parkinsonian syndrome is that the same sluggishness which qualifies the thinking and movements of these patients affects also their conative faculties. They have little or no initiative. In the advanced stages they will sit for hours motionless. In less advanced cases it is frequently reported that they will "stay indoors and show no desire to go out." A year after the attack nine patients showed features of the Parkinsonian syndrome to a marked degree, and seven were then in other institutions; in all the condition developed in less than six months after the original attack; in one it appeared immediately after, and in most within one to three months.

In these patients the most common features of the syndrome were muscular rigidity, bradyphrenia, bradykinesia, etc., and salivation. Tremors were uncommon, only one example being noted—a slow rotatory movement of the head. The muscular rigidity was generalized except in one instance—a boy of 11 years, in whom rigidity with a slight degree of paresis was confined to the right side of the face, the right arm, and right leg. In a woman aged 53 the rigidity was so great that the mouth could not be opened nor the tongue protruded, and considerable effort was required to raise the eyelids. In one young woman with advanced Parkinsonism a disturbance of the respiratory mechanism developed; it was due probably to spasticity of the laryngeal muscles, which has been rarely, if at all, described. Respiration was accomplished by short inspiratory gasps, which were followed by noisy forcible expirations—almost as if she were attempting to blow out a light. The ages of the subjects in this group ranged from 11 to 53 years. Two boys, aged 11, had muscular rigidity, bradyphrenia, bradykinesia, etc., all to a marked extent. The initial attack in all these cases was severe. In eight patients Parkinsonism had developed only to a slight extent. The most common elements in this group were the typical facies and some degree of bradyphrenia, bradykinesia, insomnia, and asthenia. Muscular rigidity was, in these patients, confined to the face. The original type of infection, with one exception, was severe.

*The Signs and Symptoms.*

The following is a list of the signs and symptoms observed a year after the attack in all patients manifesting sequelae. The total number of cases examined was 128.

| Sign or Symptom. | No. of Cases. | Sign or Symptom. | No. of Cases. |
|---|---|---|---|
| Insomnia | 55 | Tics | 13 |
| Asthenia | 46 | Pallor | 13 |
| Day drowsiness | 31 | Restlessness | 11 |
| Psychic changes | 24 | Headache | 11 |
| Nocturnal restlessness | 21 | Pareses | 7 |
| Parkinsonism | 17 | Neurasthenia | 6 |
| Pain | 17 | Constipation | 5 |
| Hyperreflexia | 16 | Adiposity | 5 |
| Hyperkinesis | 14 | Speech changes (excluding bradyphasia) | 6 |
| Eye symptoms: | | Abnormal gait (excluding bradybasia) | 5 |
| Paresis of accommodation | 14 | Nocturnal enuresis | 3 |
| Anisocoria | 10 | Absent-mindedness | 3 |
| Ptosis | 5 | Bulimia | 2 |
| Blurred vision | 4 | Furunculosis | 2 |
| Diplopia | 3 | | |
| Squint | 2 | | |
| Myosis | 2 | | |

This table affords some conception of the varying range of signs and symptoms that may be presented a year after the attack. The two symptoms which head the list, insomnia and asthenia, were the prominent features in those patients who were slightly impaired, but still able to follow their occupation, although with more or less difficulty. None of the patients required to be certified mentally deficient.

These notes give some impression of the degree and form of disablement in 128 cases caused within a year by an attack of encephalitis. All degrees of disablement, and many different and complex types, were observed. Disablement—including the slighter forms—existed in 62 per cent., while incapacity to resume work or school was found in 30 per cent.

These figures agree closely with the results of a similar inquiry made in Glasgow. A series of 334 patients who contracted encephalitis lethargica in 1924 was investigated fifteen to eighteen months after the attack, with special reference to the capacity for work. It was reported that 36 per cent. were unfit for work. Some of these patients had been treated in hospital and some at home.

It has been recognized for some time that the existence of disablement due to encephalitis lethargica constitutes a problem which public health authorities have to face. The problem has been tackled in Scotland, as in other countries, by the establishment of a hospital unit where cases are admitted for special investigation and research.

REFERENCE.
[1] Walshe, F. R. M.: *Med. Science*, 1920, iii, 51.

## HEALED FRACTURES OF TRANSVERSE PROCESSES.

BY
OWEN L. RHYS, M.D.,
RADIOLOGIST, ROYAL INFIRMARY, CARDIFF.

IN 1910, and again in 1913, I published a few cases in the BRITISH MEDICAL JOURNAL of what I termed pseudo-fractures of the lumbar transverse processes. In nearly all there was no history of injury, and I suggested that they were attempts at rib formation by the costal element in connexion with the transverse processes. Dr. Reginald Morton also emphasized the importance of these conditions from the medico-legal standpoint.

Since then I have seen scores of cases in which gaps, and wide displacements, appear in several processes, sometimes on both sides of the vertebrae, where no injury had occurred.

In this district, where back injuries and fractured spines are common, the problem of deciding whether trauma has anything to do with the condition shown in a radiograph arises almost every day. In some of the widest separations I have seen, in which perhaps four processes have been displaced downwards for an inch or more, there has been no strain or blow, but I have now and then found a similar condition below the seat of an injury, and in several cases the man has placed his finger on a spot as the seat of pain, which has proved to be exactly over a separated process. In such cases I always attribute the separation to the injury. The case here illustrated by diagrams taken from radiographs is interesting because it for once answers a question which has often been raised—namely, if these processes have been fractured why do they not follow the usual method of healing with callus formation?

FIG. 1

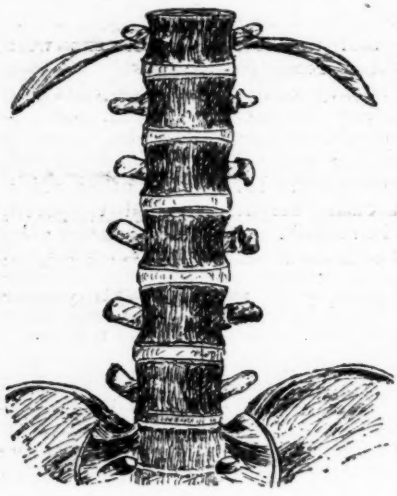


FIG. 2

A Welsh collier, aged 55, was struck in the left loin by some falling material. He was much bruised and had a small wound. Some weeks later a radiograph showed the first four left lumbar transverse processes separated as shown in the diagram (Fig. 1). The man resumed work, and, after a time, did full collier's work for some months. Then, after an unusual twist, he had pain in the left loin and gave up work. I took the radiograph (Fig. 2) some two and a half years after the first accident. The first process remains as before; the remaining three have fused together in a mass of callus about four inches long and one inch wide, running parallel to but separate from and behind the bodies.

I have previously seen slight attempts at callus formation in single fractured processes, but never anything so extensive as this.

On the vexed question whether strain, as distinct from direct violence, can fracture these processes, I can only say that I have not been satisfied in any case that it has occurred. I think it more likely that muscle or muscle attachment would give before bone. Before I accept even direct violence as a cause I expect the following conditions to be fulfilled.

1. A definite history of a blow over the site of the suspected fracture. I have seen a workman awarded compensation because a radiograph showed a separated second lumbar transverse process. His injury was a fall on the buttocks on a smooth floor, whilst pushing a wheelbarrow. His symptoms were those of sciatica.

2. The lesion must be unilateral. It is inconceivable that an injury could fracture transverse processes on both sides without also fracturing the spinous process.

3. The immediate after-history should be reasonably consistent with the man having had a severe blow. Considerable force is necessary to break a bone covered as these processes are covered, and I should expect very definite evidence of bruising, and probably a wound. So much depends upon the man, that his capacity for working on varies enormously. Some of the old Welsh colliers have extraordinary powers of bearing pain, and will manage to walk home after such an injury, but any attempts at working or stooping would naturally be extremely painful.

## AN INFLUENZAL CONDITION SIMULATING THE ACUTE ABDOMEN.

BY

R. ST. LEGER BROCKMAN, M.CHIR., F.R.C.S.,

ASSISTANT SURGEON TO THE SHEFFIELD ROYAL INFIRMARY.

THE responsibility of deciding whether a case is one needing the immediate aid of surgery, or whether the abdominal signs are the mask of a medical condition, is no uncommon experience. When faced with this type of case the medical practitioner will be alive to the possibility of pneumonia or of a sudden pneumothorax, of uraemia, and of the nervous crises of tabes and pernicious anaemia; but when all these have been reckoned with there remains another class not infrequently submitted to needless surgery.

Many can call to mind a case in which the abdomen was opened under the impression that an acute catastrophe had taken place, but no gross lesion of any organ could be discovered, only a slight amount of free fluid, sometimes blood-stained, scattered petechial haemorrhages, and small bags of jelly-like lymph. After careful search a more or less normal appendix has been removed, and the surgeon has closed the abdomen with no small degree of secret chagrin.

During the last two years I have seen in consultation a series of fifteen cases, all remarkably constant in general type, with marked signs and symptoms pointing apparently to some acute surgical intra-abdominal lesion. In one instance I performed laparotomy on the diagnosis of acute intestinal obstruction. I found the free fluid, the jelly-like lymph, and the subperitoneal petechiae. There was in addition, in the lower portion of the ileum, a persistent contraction ring with distended gut above and collapsed intestine below. No organic cause of any nature could be discovered. This man recovered in spite of the treatment, whilst all the others have reached the same happy ending without the intervention of surgery.

These cases form, I believe, a definite clinical condition, which can mimic, as it did in this series, any type of acute surgical abdominal condition. Taking this case which I opened with the previous sporadic ones exhibiting similar intra-abdominal findings, and comparing all as regards their clinical signs and symptoms, I think that it is possible to offer a reasonable hypothesis for their cause and pathology.

The onset was sudden; vomiting of bile-stained material was an early sign, but was not persistent. The patient was seized with the most acute pain without any previous feeling of malaise or other warning symptom. In some the pain was in the upper abdomen, in others in the lower. The acute spasms of pain were intermittent, with intervals of comparative freedom varying from five to fifteen minutes. During the spasm the muscles in the affected area could be felt, and at times could be seen to go into a condition of cramp. During the attack there was board-like rigidity in the affected area which did not completely disappear with the pain. Palpation caused pain, but the patient complained before the pressure of the examining hand had reached the peritoneum. The tender layer appeared to lie in the muscles of the abdominal wall rather than in the peritoneum. It is a distinction which is not very easy to explain in writing, but it can be clearly observed in the clinical examination.

The severity of the pain was most marked, and the way in which it could wring a cry from strong men suggested, when seen for the first time, that an acute perforation of

a hollow viscus had occurred. These patients did not, however, lie still, as does one with acute perforation, but rolled about in pain; some of the patients insisted on getting into the knee-elbow position during the spasms. The abdominal respiratory movement was little if at all impaired in spite of the large degree of rigidity. This is a point which I believe is always of great value in diagnosis between a surgical abdomen and referred abdominal symptoms. It is a sign which I have before described as "the respiratory movement resistance-ratio."

The pulse rate in most cases was unaltered at the commencement of the trouble, the temperature was normal or even subnormal. The facial expression was in no way suggestive of an abdominal lesion, and was a valuable piece of evidence. In twenty-four to forty-eight hours the picture changed, and signs suggestive of influenza were manifest, whilst the pain had in large measure disappeared. It is with the cases in which an acute obstruction is suspected that most difficulty arises. It is hard to refrain from opening the abdomen in a doubtful case when two enemas have produced no result. The passage of intestinal contents may be arrested in three ways: by mechanical obstruction, by paralytic ileus, and by acute spasm of the intestine, or what is called spastic ileus. The one case which I opened was of this type. Its association with influenza has been noted by other observers. If this condition is suspected and two enemas have no result, then the correct treatment is to give an injection of morphine and follow this by another enema in half an hour. In my experience a good faecal result will follow this practice, and so prevent untimely surgery.

There appears to be a definite seasonal incidence, since these cases have mostly occurred during an epidemic of influenza. As happens with influenza, relapses were not uncommon in this series, in some of which the whole sequence of events was repeated after a fortnight or three weeks; in one instance of a girl who had severe vaginal and pelvic pain three attacks supervened.

In other cases of influenza pain of a similar nature has been felt along the course of the fifth cranial nerve, and in some this has been followed by a herpetic eruption over the area so supplied; in others an eruption has not appeared although the acuteness of the pain in the area has been just as marked. A true herpetic eruption was seen in only one of this series. In another case, however, which suggested an acute cholecystitis, in place of the ordinary vesicular appearance of the herpetic lesion a crop of petechial haemorrhages with the same characteristic spacing and distribution was later seen in the area of the skin of the abdominal wall affected by the pain. I have on one other occasion seen pain along the course of cutaneous nerves followed by a similar haemorrhagic manifestation of herpes.

In encephalitis lethargica, which also in some measure keeps pace with influenza epidemics, an intermittent painful spasm of the abdominal musculature is a well known feature.

The suggestion which is here put forward in explanation of the pathology of these cases is based on the work of Sir Thomas Lewis on the setting free of a histamine-like body in the skin by the use of antidromic nerve impulses. It is suggested that the influenza toxin or some ultramicroscopic virus associated with the disease causes a lesion of the posterior root ganglia. Instead of a toxic agent being set free in the skin, as it is in some instances as a result of such irritation, this happens at the nerve endings in the subperitoneal tissues, and so gives rise to the petechial haemorrhages and the free fluid which are the common pathological changes seen if the abdomen is opened in these cases.

# Memoranda:

## MEDICAL, SURGICAL, OBSTETRICAL.

### PAPILLOEDEMA AND ARTERIO-SCLEROSIS.

DURING May, 1926, two patients were admitted to the ophthalmic ward of St. Bartholomew's Hospital complaining of failing vision.

CASE I.

A man, aged 52, had been in the hospital in June, 1925, when he complained of failing vision, and was found to have marked swelling of both discs, unaccompanied by haemorrhage or exudation. There was also well marked retinal arterio-sclerosis. Vision in both eyes was much reduced (< 6/60). The heart was slightly enlarged; the blood pressure was 260/160, and there was a trace of albuminuria. No nervous lesion was discovered. The Wassermann reaction was negative. He was discharged at the end of June, 1925, *in statu quo*.

On readmission in May, 1926, he had the same degree of papilloedema and of retinal arterio-sclerosis as before, but vision was still more reduced. His complexion was blotchy and unhealthy. The heart was not appreciably larger than before; blood pressure 260/140. There was no nervous lesion. The urine contained a heavy cloud of albumin, urea 1.65 per cent., and there was a scanty deposit consisting of a few white blood corpuscles, epithelial cells, and hyaline casts.

CASE II.

A man, aged 52, gave a history of failing vision (presbyopia) for four years. He was found to have considerable swelling of both discs with no haemorrhages or exudation. Arterio-sclerotic changes were well marked in both fundi. Vision in both eyes was 6/12. The general examination revealed that his health was good. The heart was slightly enlarged; blood pressure 205/145. No nervous lesion was discovered. The urine contained a trace of albumin; urea 2.6 per cent.; a moderate deposit contained a few white blood corpuscles and a few epithelial cells.

In both these cases there was well marked papilloedema of a type which, ophthalmoscopically, was indistinguishable from that seen in cases of cerebral tumour. The only other changes were those of arterio-sclerosis. There were no haemorrhages and no exudation. The clinical diagnosis in each case was persistent hypertension, and the diagnosis lay between hyperpiesia and chronic interstitial nephritis. The high diastolic pressure in both cases is in favour of chronic interstitial nephritis, in which the diastolic pressure tends to be rather higher than in the purely vascular group. In the first case the presence of a heavy cloud of albumin was also in favour of chronic interstitial nephritis. In both cases there was absence of symptoms of renal function failure or renal toxaemia; there was no loss of weight in Case II (slight in Case I); no digestive disturbance, no micturition changes, and no secondary anaemia. In both cases the kidneys could concentrate well. There were no red blood cells or appreciable excess of white blood cells in the urine.

Dr. Geoffrey Evans has shown that arterio-sclerosis of a certain form is a constant pathological change found after death in vessels of patients suffering from persistent hypertension during life. In both cases, therefore, the pathological diagnosis of diffuse hyperplastic sclerosis can be made. But whereas Case II belongs to the group of essential hypertension, or hyperpiesia (German arteriolo-sclerosis mitis, or nephro-sclerosis lenta), the first case belongs, more probably, to the group of chronic interstitial nephritis (German arteriolo-sclerosis gravis; Volhard's form of malignant hypertension). The striking point is the amount of papilloedema. In both cases, as has been stated above, this was present in the degree which is seen in cases of pronounced increased intracranial pressure, and, indeed, it was indistinguishable from that which occurs in this condition.

Papilloedema does occur in renal retinitis, but rarely to such a degree, and is very seldom unaccompanied by other evidence of renal retinitis—such as cotton-wool patches and haemorrhages. Further, in Case II the renal origin of the disease can be, with a good deal of certainty, excluded.

It is noteworthy that the amount of papilloedema in Case I remained unchanged after one year.

It is suggested that the papilloedema in these cases is associated with persistent hypertension and arterio-sclerosis.

These cases are published in order to call attention to this association, for by following up such cases it should be possible to tell if Bright's disease in any form develops.

My thanks are due to Mr. R. Foster Moore and Dr. Geoffrey Evans for their assistance in compiling these notes.

London, N.W.3. J. G. MILNER, B.A., B.Ch.Cantab.

## SPONTANEOUS RUPTURE OF THE HEART.

WE desire to place on record the following notes and *post-mortem* findings of a case of sudden death in a woman aged 79.

Mrs. N., who had previously complained of breathlessness and flatulent dyspepsia, rose from bed as usual at 7 a.m. She was heard to give a scream and to fall on the floor. The relatives saw her at once and replaced her in bed. She was unconscious, and efforts were made to give her restoratives. When seen half an hour later by one of us (J. R. S.) she was dead. It was thought that death had occurred within fifteen minutes.

*Post-mortem* examination revealed fairly healthy conditions of all organs with the exception of a number of small gall stones, and a spleen weighing 9¾ oz. relatively soft and friable. The pericardium was tense and distended, and, on incising the pericardial sac, blood clot weighing 9¾ oz. was found forming a cast round the heart. The blood clot was nowhere adherent except at three places about a quarter of an inch in diameter over the anterior aspect of the heart muscle. At the lowest of these places the clot dipped down into the fatty heart substance. On careful inspection of the heart and large vessels no opening for the escape of blood was found except as later stated.

The heart weighed 15½ oz. The mitral valve cups were thickened. The chambers of the heart were empty of blood clot with the exception of a small clot in the right ventricle. The muscle was pale and flabby, and the anterior wall of the right ventricle seemed to be almost entirely replaced by fat and fibrous tissue. This part was translucent, and a small oval aperture with fairly smooth edges could be seen, the position of the opening being in the lower half of the right ventricular wall a quarter of an inch from the interventricular septum.

This portion of the right ventricle was submitted for further examination and reported on as follows: "There is an actual perforation of the heart wall, leading into the pericardium, and sections show that the cardiac muscle is very atrophic and actually deficient in several places, especially in the region where the macroscopic hole occurs. The coronary artery supplying the area is arterio-sclerotic and shows narrowing of its lumen and partial blocking in many places."

A number of similar cases have been already reported in the BRITISH MEDICAL JOURNAL (1924, vol. ii, pp. 373, 465, 669; 1925, vol. i, p. 262), and it is interesting to note that in the seven cases reported (including our own) six occurred in female patients. In every case except that here recorded the tear was found in the wall of the left ventricle.

J. R. STOTT, M.D., B.Sc.
R. BLAIR, M.A., M.B.
Surbiton.

## A RISK OF LIQUID PARAFFIN IN CHRONIC CONSTIPATION.

MINERAL oils have become so suspect as a cause of cancer of the scrotum that it seems questionable therapeutics to prescribe paraffin in cases of chronic constipation. Pure medicinal petroleum, as liquid paraffin is labelled, may be as perfect a preparation as it is possible to get, but it cannot be gainsaid that when expelled, in due course, from the rectum it is a dirty oil, and thus the anal region is kept in constant contact with dirty oil. Owing to the arrangement of the muscle at the anus the skin in this region presents a stellate arrangement with the anus as centre, and if, by any cause, the skin of the region becomes inflamed, folds and fissures are liable to develop which are cleaned with great difficulty. Thus a condition comparable to that obtaining on the scrotum is easily set up. Further, in many people the oil seeps through the anus and soils the underclothing, and if the patient continues to swallow the paraffin the whole of the buttocks may be in constant contact with oil.

My attention was first directed to paraffin as an irritant to this region by the following case:

A man, aged 48, consulted me for eczema ani, from which he had suffered for over twelve months. He had been the subject of constipation since childhood, and during the past two years had taken liquid paraffin with some success Twelve months ago he thought the anal region felt wet, though the underclothing was not soiled. Later the part became itchy, and when I saw him the perianal region was the seat of a weeping eczema and inflamed with a stellate condition leading to the anus. Lotion was prescribed to settle the inflammation, with, however, little success. I then stopped the paraffin and prescribed compound liquorice powder as an aperient. The eczema began to settle almost immediately, and in a few weeks he was quite recovered.

Since this experience I have had five cases of eczema ani, three of whom were the subjects of chronic constipation and were taking paraffin. In all the paraffin was stopped before commencing treatment for the skin condition.

ROBERT GIBSON, M.D.,
Honorary Dermatologist to the Salford Royal Hospital; Assistant Honorary Physician, Manchester and Salford Hospital for Skin Diseases.

# British Medical Association.

## CLINICAL AND SCIENTIFIC PROCEEDINGS.

### OXFORD AND READING BRANCH.—OXFORD DIVISION.

*Surgical Treatment of Gastric Ulcer.*

AT a meeting of the Oxford Division at the Horton Infirmary, Banbury, on April 22nd, with Dr. W. COLLIER in the chair, Professor GEORGE E. GASK, director of the surgical unit St. Bartholomew's Hospital, delivered a British Medical Association Lecture on gastric ulcer.

Professor Gask said that there had been gradual improvement in the surgical treatment of gastric ulcer in association with the better diagnosis of this condition. The first great advance had followed the invention of test meals, which were still valuable, though sometimes disappointing. A further stride had followed the introduction of *x* rays, and the accuracy of the radiographical diagnosis as verified by operation had been found to be as high as 88 per cent. Professor Gask illustrated by lantern slides the diagnosis of ulcers in various parts of the stomach following the administration of a barium meal, and insisted that *x* rays must not be allowed to supplant careful clinical examination, with especial reference to such clinical points as the duration of the pain and the habits of the patient. Such examination should include the study of the blood, the stools, and the gastric contents after the exhibition of a test meal. Professor Gask thought it was most necessary for the surgeon to be present at the radiographical examination. He said that the type of gastric ulcer had changed in the last twenty years; it seemed that the acute type formerly found in chlorotic girls had disappeared. Surgical treatment was urgently indicated in cases of perforation, pyloric stenosis, carcinomatous implantation, and sometimes in haematemesis. Although medicinal treatment might sometimes cure the condition there was often no improvement, and then more active measures were required. It was undesirable to delay so long that the patient was worn out by the pain. With regard to the type of operation, gastro-enterostomy was the simplest and most useful when there was pyloric obstruction from old ulceration. Good drainage was obtained, but it was necessary to remember the occasional failure, and the possibility of the return of pain and ulceration. Professor Gask briefly discussed the operation of pyloroplasty advocated by Professor Finney of Baltimore. It was difficult to adjudicate between the relative values of gastro-enterostomy and gastrectomy, but the latter appeared to be gaining the day. Much depended on the site of the ulcer. For instance, when it was high up, on the lesser curvature—in which situation medical treatment was of little or no avail—some form of gastrectomy, even though it meant sacrificing a large part of the stomach, was the operation of choice. The cause of gastric ulcer was still undetermined, and consequently all treatment at present was empirical; it was possible that under better social conditions the disorder might be eliminated. In the meantime, as far as operations were concerned, the immediate results of large gastrectomy were good, but only time could show what the ultimate results would be. Some of the patients on whom gastrectomy had been performed had subsequently developed severe anaemia. Professor Gask's dispassionate survey of gastric ulcer and its treatment was much appreciated; it was discussed by several members. A vote of thanks, proposed by Mr. WATERFIELD and seconded by Mr. HUGH WHITELOCKE, was carried with acclamation.

Dr. PENROSE showed four cases.

(1) A woman, aged 53, had first sought advice in January, 1925, for pain in the neck and throat. Marked jaundice had come on suddenly three days before, but the urine had been dark for some weeks. There had also been loss of appetite for some weeks, but no pain or vomiting. The jaundice had continued, but the patient's weight, which had gone down at first, was now the same as when she was first seen. Attacks of diarrhoea began toward the end of 1925 and had continued subsequently. Chronic pancreatitis, malignant disease, and gall stones had been suggested as the diagnosis.

(2) A man, aged 50. This patient had had attacks of loss of consciousness for two years, tending to be increased by worry.

He had always been sallow, and venereal disease was denied. Hystero-epilepsy, heart-block, and Addison's anaemia had been suggested.

(3) A man, aged 30, who presented signs of pyloric obstruction and subsequent anaemia, had at one time shown evidence of early combined degeneration of the spinal cord, but this improved under treatment.

(4) A man, aged 35, had had a severe haematemesis while under treatment in hospital for myelitis. Another case was reported of a man, aged 65, who had had a fatal haematemesis following a three months' history of indigestion. At the *post mortem* a small ulcer was found in the stomach with a pin-hole perforation into a vessel.

# Reports of Societies.

## HYPNOTIC DRUGS OF THE BARBITURIC ACID AND SULPHONAL GROUPS.

AT a meeting of the Section of Therapeutics and Pharmacology of the Royal Society of Medicine on May 10th, Dr. GEORGE GRAHAM presiding, the subject of the clinical and pathological effects of hypnotic drugs of the barbituric acid and sulphonal groups was introduced by Sir WILLIAM WILLCOX, who incorporated in his remarks some work on the historical and statistical side by Dr. HELEN YOUNG, while Dr. F. A. PICKWORTH described experimental researches on the effect of these drugs on animals.

Sir WILLIAM WILLCOX said that he had for a long time been impressed by the potent action of these drugs when given in a single large dose or in doses repeated for several days or longer. Definite signs of organic paralysis had occurred after administration, passing away on the discontinuance of the drug, and marked mental symptoms, depression, and hallucinations had also been observed. The dangers of these drugs had not been sufficiently realized by the medical profession or the public, and the danger was accentuated to-day when, in addition to veronal, medinal, luminal, and other drugs of the older series, there were placed on the market a large number of new barbituric acid compounds and derivatives whose fancy names concealed their composition, so that unless minute scrutiny was given to the pamphlets issued with these drugs their nature was liable not to be discovered, and the glowing descriptions of their therapeutic actions did not make it plain that they were dangerous unless used with the greatest care. Until the introduction of veronal in 1902 the sulphonal group of drugs held a prominent position as hypnotics, but since then the members of the barbituric acid group had come to the fore. The barbituric acid drugs in therapeutic doses acted rapidly, and were fairly certain hypnotics. A single therapeutic dose was usually followed by a satisfactory period of natural sleep, and no marked after-effects followed when the therapeutic action had passed away, which should be in from six to twelve hours. In cases of insomnia the use of these drugs was very apt to lead to the formation of the hypnotic habit. It was a mistake to prescribe these drugs in repeated doses for painful neuralgic conditions; they were hypnotics, not analgesics. The members of the sulphonal group also were powerfully acting hypnotics, but with these the therapeutic effect of drowsiness and sleep might not commence for several hours after administration, and this delay and uncertainty had prevented drugs of this class from coming widely into use, though the same caution must be given with regard to them as with regard to the barbituric acid group.

The symptoms observed after taking doses larger than the therapeutic dose of members of the barbituric acid group—or, in cases of idiosyncrasy, after taking the therapeutic dose—were headache, vertigo, and ataxia, occurring within a few minutes, and within an hour or so the patient might fall into a deep sleep from which he could only be roused with difficulty. Albuminuria of a mild type might occur and be associated with the presence of casts. There might be incontinence of urine or faeces. A rather common occurrence with overdose was the development of bronchopneumonia, which came on very suddenly, and might be of the massive type; nearly all the fatal cases had bronchopneumonia. With veronal the average dose in the fatal cases was 50 grains, but death had occurred after as small a dose as 10 grains, though other factors were probably present, and, of course, recovery had taken place after much larger doses than 50 grains. People who took veronal every night were liable to show, not only certain mental, but certain moral changes, to get exceedingly depressed, with suicidal tendencies, and to have hallucinations, commonly visual, and sometimes delusions. The veronal subject showed symptoms it was difficult to distinguish from chronic nerve disorder; he had the same kind of speech that was found in general paralysis of the insane, also diplopia and visual paralysis. The kidney had a remarkable effect in picking up these drugs, and in some of the analyses in cases of veronal poisoning two or three times as much veronal had been found in the urine as in the blood. A characteristic feature with luminal was haematoporphyrinuria. To the sulphonal group the same warnings applied. The drugs of this group had been very carelessly administered because they were thought to be harmless, but addiction did occur.

In conclusion Sir William Willcox exhibited some analyses made in cases of veronal poisoning, and also gave statistics of the deaths from poisoning by barbituric acid drugs since the first case in 1906. The number of deaths rose by 1915 to over 20 annually, and did not decrease until, in 1918, the drugs were placed in Part II of the Poisons Schedule, after which the annual number of deaths dropped to about 8, but in the last year or so it had risen again, and in 1925 the number was 25. These drugs should only be given by prescription, marked "not to be repeated," the prescription to be retained by the pharmacist, and the total number of doses ordered should not exceed six. The patient should be warned against the daily use of the drugs, and it would be a safeguard to avoid giving the drugs on consecutive days. The medical profession should also be seriously warned against the widely circulated advertisements or drugs of the barbituric acid group. These advertisements frequently recommended the drugs for continued administration without calling attention to the toxic effects which might result from their use. The continued introduction of new barbituric acid derivatives, which must of necessity have had only an inadequate clinical trial, increased the danger of the position.

Dr. F. A. PICKWORTH then gave an account of some experimental researches on the effect of these drugs on animals, accompanying it by an exhibition of histological specimens. This work was initiated by the late Sir Frederick Mott, with whom Dr. Pickworth collaborated, and it went to prove that the clinical symptoms of paralysis of the central nervous system following the use of these drugs could not be regarded as a mere temporary intoxication of a harmless type, but were associated with definite objective changes of a serious nature. Dr. Pickworth entered into much detail with regard to the pathological changes found in the tissues of animals—monkeys and cats—after the administration of these drugs.

Dr. W. E. DIXON said that it was difficult to explain why persons suffering from drug poisoning should get pneumonia. What was the mechanism? Was it that the leucocytes were paralysed? Veronal did not go to the lungs, and yet a lung lesion was produced. He also remarked on the selective action of the drugs in causing paralysis in one limb rather than in another.

Dr. F. PARKES WEBER mentioned an interesting case of haematoporphyrinuria from veronal poisoning. It was in a woman who for two months had been taking 5 grains of veronal almost nightly as a hypnotic. The urine for a considerable time was red or red-brown in colour, and the colour disappeared gradually within two weeks after discontinuance of the veronal. He also mentioned an extraordinary bullous eruption with jaundice occurring in a child who had been given therapeutic doses of luminal for chorea.

Dr. P. HAMILL referred to the great difficulty of diagnosing veronal poisoning. He asked Sir William Willcox whether he had actually observed similar toxic phenomena with the new drugs of the barbituric acid series, because in a certain number of cases drugs of this type did relieve pain in a remarkable manner. Professor GUNN remarked that veronal lowered the bactericidal power of the blood. Dr. STOLKIND mentioned a case of medinal poisoning in

which the effects were the same as those seen with veronal. Dr. DOROTHY HARE said that in giving luminal in epilepsy she had never exceeded 2 grains, but recently in one case, after a long spell of treatment, she noticed a decided lethargy, which she at first thought to be a mild attack of encephalitis lethargica, but now wondered whether it might be mild luminal poisoning.

Sir WILLIAM WILLCOX said that luminal undoubtedly was very toxic, and would cause the same changes as had been described. Luminal and the members of the barbituric acid group were not cumulative in the material sense, for they were rapidly excreted by the kidney, but the effects on the nervous system were cumulative. Why pneumonia occurred in veronal poisoning he did not know. He had always put it down to the abolition of the reflexes in the upper respiratory tract, which led to the passage of foreign substances into the lung. As for the new drugs of this group issued under different names, he believed that they did cause toxic symptoms; he had had several letters to that effect, and had himself seen cases.

## DEVELOPMENT OF SCHISTOSOMA MANSONI.

AT the annual general meeting of the Section of Tropical Diseases and Parasitology of the Royal Society of Medicine on May 4th, the President, Professor R. T. LEIPER, F.R.S., in the chair, Dr. J. B. CHRISTOPHERSON read a paper by Dr. P. H. J. LAMPE of Dutch Guiana on the development of *Schistosoma mansoni*.

Dr. Lampe had made an intensive study of the development of this parasite in South America. He had found that the miracidium crept slowly out of the egg shell, which ruptured on reaching water; he had never observed the dilatation seen in the bladder form. This miracidium could not live for more than forty hours without entering a snail. The intermediate hosts were two species of *Planorbis*, and about 15 to 18 per cent. were infected. Most of the miracidia disappeared into the buccal and mantle cavities of the snail, and Dr. Lampe believed that infection occurred normally through the mouth. In the snail, as the result of the usual asexual multiplication, an enormous number of cercaria were produced—in one case estimated there were about 170,000 formed at the rate of over 2,500 daily. Although Dr. Lampe had been able repeatedly to infect experimental animals through the skin, the penetrating cercaria were difficult to find, and he suggested that they passed very rapidly to the subcutaneous tissue; when a wound was present they were more easily traceable. The cercaria did not make use of the hair follicles or pores to gain admittance, but actually severed and lifted the skin. In the host he found that the larvae, after piercing the skin or mucous membrane, rapidly reached the subcutaneous tissue and then the veins and the right heart, where they might be found within six hours of infection. Once in the circulation they passed to the lungs, where they left the branches of the pulmonary artery and then penetrated the stroma between the alveoli, especially at the base of the lungs. Only a few parasites were able to leave the lungs, and these pierced the visceral pleura and reached the diaphragm three days after infection. At this stage more died, but some passed to the liver through the adhesive connexion with the diaphragm; in the stroma development was very rapid, and in a few days the cercaria resembled adult parasites. From the liver the young parasites proceeded to the portal system. Dr. Lampe believed that full-grown parasites might not infrequently be found in the lungs, as he was unable to explain the important alterations in that organ on any other hypothesis.

Professor R. T. LEIPER drew attention to the fact that although Dutch Guiana was infected with *Schistosoma mansoni*, British Guiana, though immediately adjacent to it, escaped. The two countries were separated by a rapidly flowing river, and the inhabitable portion of the British territory was largely land reclaimed from the sea, and was accordingly salty. He believed that this salt prevented the development of the snail in that country. He thought that it was still premature to consider as definitely settled the course which the larvae adopted after entering the skin. There were two schools of thought. One believed that the somewhat amoeboid cercaria could pass through the lungs and so return to the heart and reach the liver by means of the blood stream. This was the more generally accepted view, but Dr. Lampe's belief that the larvae passed from the lungs directly through the diaphragm to the liver might also be true. An analogous method of infection was known, not only in the case of the common liver fluke of sheep, but in the lung fluke of man. It might well be that both methods of gaining access to the liver were possible.

## TREATMENT OF URETHRAL STRICTURE.

AT a meeting of the Brighton and Sussex Medico-Chirurgical Society, on May 5th, the President, Dr. E. RIVAZ-HUNT, in the chair, Mr. F. E. FEILDEN gave an address on the treatment of urethral strictures, and demonstrated the old and new types of urethroscopes.

Mr. Feilden said that stricture of the urethra was a serious condition, but it was not seen so frequently now as a comparatively few years ago. For its efficient treatment it was necessary to realize that the bulb, where most strictures occurred, was the widest portion of the urethra and the external meatus the narrowest. Many strictures could be cured by a Kollmann's dilator. The best results in urology were only to be obtained by an intimate knowledge of the pathological condition. Strictures of the urethra in order of frequency were of inflammatory, traumatic, and congenital origin. Gonorrhoeal strictures were often multiple. A single stricture in the penile urethra was uncommon. Except after operation, strictures were rarely found in the prostatic urethra. About 75 per cent. of strictures occurred in the bulb, probably partly because this was the most dependent part of the urethra and gonorrhoeal discharge tended to collect here. Moreover, since this was the point of the fixed course of the urethra, the full force of micturition was directed hither, producing trauma, which resulted in infiltration of the mucosa. When the narrowing had progressed sufficiently to cause obstruction, the force of the urinary stream increased the chronic inflammatory reaction. In support of this view it was added that in cases of multiple strictures the narrowest stricture was situated nearest the bladder. Mr. Feilden thought that excision of strictures should be reserved for those due to trauma; in other cases it was unnecessary. It was probable that the incidence of stricture could be reduced if every patient with gonorrhoea, before being discharged as cured, was submitted to full dilatation. Greater use should be made of the urethroscope; some strictures could not be diagnosed without its aid. A gentle hand was most essential in passing urethral instruments. Unfortunate results were produced not so much by the introduction of organisms as by avoidable trauma of the urethral mucosa. Most strictures were amenable to treatment by dilatation. As regards silver instruments, the smaller sizes should be avoided, for they were likely to produce false passages. Silk-web bougies should be used up to 18, then steel bougies up to 12/15; the stricture should then be dilated up to 45 (Charrière scale) with the Kollmann pattern. In chronic retention, to avoid disaster, rapid evacuation of the bladder should never be allowed to occur. Strictures must not be forced, but some could be rapidly dilated at one sitting. Internal urethrotomy was a most satisfactory operation; often after internal urethrotomy and full dilatation no further instrumentation was necessary. If there was marked urinary infection or renal insufficiency, drainage of the bladder should precede the urethrotomy. In impermeable strictures or those resulting from trauma, the urethrotomy of Wheelhouse was the method of choice; it should be used in all cases of stricture of the bulb associated with periurethritis, periurethral abscess, extravasation of urine, or severe cystitis. In elderly patients with recurring epididymitis a bilateral vasectomy might be performed with advantage. A malignant prostate closely resembled a stricture in that there was no residual urine in either case. Tabes, by producing bladder atony, might be the cause of an apparent acute or chronic retention. The infection behind the stricture must be treated concurrently with the stricture.

# Reviews.

## SLIT-LAMP OPHTHALMOSCOPY.

THE introduction of the direct examination of the eye by means of an efficient microscope and the slit-lamp has given the ophthalmic surgeon a most refined and beautiful additional mode of extending the field of his investigations. For those to whom the method is known by name, but to whom its basis is mysterious, a reference to an observation which most children make, with wonder, will provide a sufficient explanation. Who has not seen a narrow ray of sunlight coming through the shutters of a closed window, and seen that the air was full of moving particles brilliant in the sun-ray? That in essence is slit-lamp examination of the eye. By means of an appropriate projection apparatus, the device of Gullstrand, a thin ray of light can be focused upon and made to cut into the eye; and the illuminated section which this ray makes against the rest of the dark and unilluminated eyeball can be examined with a binocular microscope almost as though that section were on the stage of the microscope. This mode of investigating pathological processes of the living eye, particularly in the cornea, iris, and lens, has been much exploited in the last few years, and some stimulus was given to it by the Middlemore Prize competition of the British Medical Association. There has just been issued a work by Mr. HARRISON BUTLER of Birmingham a valuable and most complete *Illustrated Guide to the Slit-Lamp*[1] as applied to disease conditions in the eye. It is a fine piece of work, to the making of which there has gone much careful observation and accurate recording. The work is founded upon a series of lectures at the University of Oxford, together with the Doyne Memorial Lecture and the Montgomery Lectures given at Dublin University. But there is nothing disconnected in the presentation of the subject in the volume under review; it is no longer a series of lectures but a co-ordinate whole. Mr. Harrison Butler is not only to be congratulated on his text, but also complimented upon his skill as a draughtsman, for, although he does not say so in so many words, we believe that the whole of the 158 illustrations in the text and the 21 additional figures in the five coloured plates are the work of his own hand. Many of these are very beautiful, almost fascinating; only in a few has the printer failed to do justice to the picture.

The use of the slit-lamp has brought no revolution to the methods or theories of ophthalmology; it has done nothing for medicine so amazing as did the introduction of the ophthalmoscope; nor has it changed the work of the ophthalmologist as did the discovery of the objective method of investigating the refraction of the eye by retinoscopy. It is a refinement upon existing methods. Focal illumination has been employed as long as the eye has been subject to examination; magnifying lenses were used so soon as they were made available; and the use of the condensing lens and the hand loupe will never be superseded. But the fine ray of light of the slit-lamp and the binocular microscope give an image of such detail and of such size that the new combination is as superior to the hand lens and glass as is a good oil-immersion objective with a well focused substage condenser better than an old-fashioned triplet objective. In certain conditions the slit-lamp is of great value in diagnosis. To determine the existence of interstitial keratitis is not always easy by the usual methods; but with the slit-lamp there is a picture so typical that it cannot be mistaken for anything else. The infiltration of the cornea is seen to be fundamentally associated with the posterior layers of the corneal stroma; and though, when the inflammation is at its height, the more anterior zones may participate in the process, yet this is secondary to the main focus in front of Descemet's membrane. The great thickening of the cornea is also notable. The appearance presents a marked difference from keratitis of the phlyctenular type. But its value is even greater in the diagnosis of sympathetic ophthalmitis, which causes the greatest anxiety to the ophthalmic surgeon. In eyes suspected of this disease Mr. Butler urges the imperative necessity for the use of the slit-lamp. A characteristic sign, shared with other forms of severe cyclitis, is the presence of cells in the vitreous, the retrolental space, and the aqueous. Later, keratitis punctata and nodular iritis appear. If in an injured eye there be some inflammation but no signs of cells in these parts, it is improbable that there is sympathetic disease. If, with other clinical signs, a cellular infiltration be evident, the eye is likely to be dangerous. Finally, if there be similar cells in the other eye, then the eye is sympathizing, and treatment is urgent.

The book is well printed, and, as we have noted, profusely illustrated; it will be of great service to other workers in this field of clinical investigation.

[1] *An Illustrated Guide to the Slit-Lamp.* By T. Harrison Butler, M.A., D.M.Oxon., etc. Oxford Medical Publications. London: Milford, Oxford University Press. 1927. (Cr. 4to, pp. xii + 144; 158 figures, 5 plates. 30s. net.)

## WHOLESOME MEAT.

THE central departments for health in both England and Scotland have made good use of the powers conferred upon them, under the Public Health (Regulations as to Food) Act of 1907, to make regulations for preventing danger arising to health from the importation, preparation, storage, and distribution of food and drink, and codes have been drawn up for both countries, equivalent in substance, though differing slightly in form, which lay down the action to be taken by meat inspectors on finding evidences of tuberculosis or other disease in the carcasses of bovine animals and swine. To all engaged in these responsible duties *The Principles and Practice of Meat Inspection*,[2] by Dr. GERALD LEIGHTON, should prove a reliable guide. Dr. Leighton describes the slaughterhouse and its methods. He cites in some detail the American federal system, under which pork is not microscopically examined for *Trichinella*, on the ground that no microscopic method is even approximately effective, and that the surest safeguard, to cook pork well, is within the reach of all. The subject of humane slaughter is carefully explored. The use of the hammer, the pole-axe, and the various shooting instruments is compared with that of the knife alone. The author's treatment of the question is impartial and he does not attempt to dogmatize, but from the facts presented by him the impression remains that there is no excuse for cruel ways of killing. The comparative anatomy of the different food animals is succinctly indicated, the distinctions between the respective cuts and organs being clearly figured and explained. The importance of the lymphatic system is recognized and the significance of glandular enlargements shown. Dr. Leighton sets forth the etiology and effects of the parasitic infections. He recounts the cryptic story of the ox warble-fly, pointing the moral with a vivid illustration of an ox-hide perforated by larvae. He tells of *Oestrus ovis*, of the liver-fluke and its transmigrations, and of other meat-infesting parasites. In his section on bacteriology the reference to meat poisoning should help to dissipate some misunderstandings. He ascribes it in one of its forms to the *B. enteritidis* of Gaertner, in the other to *B. botulinus*. He dismisses ptomaines as a practical cause of meat poisoning. "These poisonous amines," he quotes, "are only formed when putrefaction is far advanced, and when the food is in such a state as to be altogether repulsive." Descending into the underworld of the meat traffic he discusses the foetal carcass, emergency slaughter, fallen animals, and the meat which he names worst of all, that of cattle dead of septic parturient fever. Among his other topics of outstanding interest are the local and general frequency of tuberculosis in cattle and other animals, the relation of bovine and swine tuberculosis, the diseases of organs and special parts, tinned foods, and the inspection of fish, game, and poultry. Dr. Leighton's book is admirably illustrated. Though primarily addressed to meat inspectors, it may be cordially recommended to the perusal of all, whether medical practitioners, medical officers of health, or students for a degree or diploma in sanitary science, who are interested in the important subject with which it deals.

[2] *The Principles and Practice of Meat Inspection.* By Gerald Leighton, O.B.E., M.D., D.Sc., F.R.S.E. Edinburgh and London: W. Hodge and Co., Ltd. 1927. (Roy. 8vo, pp. xv + 465; 120 figures. 25s. net.)

## MALARIAL PSYCHOSES AND NEUROSES.

THE mental and psychic aspects of malaria have been largely neglected in the past, and the work of Dr. W. K. ANDERSON on *Malarial Psychoses and Neuroses*[3] is, therefore, welcome. The child of neglect, when its unfortunate condition once comes to be recognized, is rather liable to suffer from excessive attention and over-indulgence; the author states in his preface that the book comprises his "experience of mental and nervous conditions apparently arising from malarial infection," and that "it will be seen that very few syndromes are absent from the list." While acknowledging that it is more than high time for so important an aspect of this most widespread of tropical scourges to be properly dealt with, we think that it is a pity that no check should have been inserted to prevent an excessive swing of the pendulum.

Of the introductory chapters, that on malaria in history, though condensed into the short space of eight pages, is interesting, and the attempt to correlate the symptoms of malaria, in its acute and chronic forms, with sympathetic, parasympathetic, and endocrine action is ingenious.

The practitioner in the tropics is always taught to bear in mind in all cases of fever the possibility of malaria, owing to its protean manifestations and remarkable powers of mimicry, but at the same time to remember that all sojourners in a malarial district are liable to show parasites in their blood and not allow themselves to be led away by this fact to regard all conditions in which such parasites occur as malarial. The tropical reader of this work will therefore be less likely to interpret the association of malaria or the subsequent finding of malarial parasites in any particular syndrome as instances necessarily of cause and effect.

The work is interesting to read, for, though largely of the nature of a compilation or selection of cases culled from the medical literature of various countries, the author's comments upon them are both instructive and suggestive, though it is clear that in a certain number of instances the diagnosis of malarial origin of the symptoms is arrived at largely by exclusion. When, after the preliminary chapters on malaria in general, the author comes to treat of the psychoses and neuroses, subjects which he has made more particularly his specialty, he seems not only to be on surer ground, but also more guarded in his conclusions, though it is sad to hear that "there is reason to believe that many cases of this kind [mental confusion the result of malaria in the war] were shot for desertion before the nature of this class of case was adequately understood." He wisely concludes an interesting chapter on clinical dementia praecox with these words: "It would be hard to say whether the cases of this series which had remained ill beyond a year were cases of true dementia praecox with malarial infection added, or whether permanent brain changes . . . had resulted from the malaria. . . ."

The book attempts to prove too much; according to it there seems to be no symptom, hardly any combination of symptoms, which cannot be ascribed to malaria, and were the views given acted upon in tropical countries it would be the rarest event for a native criminal to be brought to justice, or at least to be held responsible.

When so close a resemblance is demonstrated between certain malarial infections and general paralysis, and even the actual production of the latter by the former, it seems strange that no mention is made of the treatment of general paralysis by malaria, if only to point out a possible danger. Perhaps it was not regarded as coming within the scope of this work, but it opens up an interesting question in therapeutics.

To the similarities and relations between alcoholism and malaria a whole chapter is devoted, and part also of the preceding one is on its medico-legal aspects. This will doubtless be eagerly read by those barristers called upon to defend the reckless motorist who, happening to have been at some time in a malarious district or to have served in the war, has foolishly substituted liquid for the customary solid lunch.

The book has been well produced; the print is clear, the text remarkably free from misprints, the figures and microphotographs are good, and the coloured plates beautifully reproduced. Judicious pruning in the next edition would add considerably to the value of the book.

[3] *Malarial Psychoses and Neuroses.* By W. K. Anderson, M.D., F.R.F.P.S.Glas. Oxford Medical Publications. London: Milford, Oxford University Press. 1927. (Cr. 4to, pp. viii + 395; 18 figures, 4 plates. 42s. net.)

## SHELL SHOCK AND AFTER.

IN *Shell Shock and its Aftermath*[4] Dr. NORMAN FENTON, associate professor of psychology, Ohio University, has presented a careful and systematic investigation of the cases of war neuroses among the American Expeditionary Force which came under his care in France, and whose subsequent history after their return to America he has assiduously explored.

All too often, as Professor SALMON, who has written an introduction to this book, observes, the emotional reactions of human beings are examined in a single setting and under a particular kind of stress. It is the unique contribution of Dr. Fenton to provide a longitudinal review of his cases, examining not only the nature of the neurosis at the time, but following them up and demonstrating the persistence or reappearance of the psychoneurotic manifestation in adverse circumstances, and in other cases its disappearance under wise psychotherapeutic guidance. It is with the aftermath rather than with the initial state that Dr. Fenton is primarily interested; and the data he has been at such pains to collect are examined for the purpose of reaching some definite conclusion regarding the ultimate outcome of war neuroses.

Dr. Fenton's work was at first carried out at Base Hospital 117, A.E.F. He had there the opportunity of first-hand study of war neuroses. Since then on two occasions he was enabled to trace the after-histories of his cases in 1920, and again in 1924, and to study the process of rehabilitation in civil life. To this end the mental and physical make-up of a typical group of shell-shock victims were examined; their social and economic background; their behaviour at home shortly after their return to America; and then some years later. In this respect the correlation between the military classification of these cases and their subsequent readjustment to civilian life is of interest. Dr. Fenton finds a positive correlation showing the prognostic value of such classification.

The typical war neuroses, such as gas syndrome, exhaustion, concussion, anxiety, show the best recovery rate, except for gas neuroses; and the more pronounced constitutional types, psychasthenia, etc., rank lower. Dr. Fenton's studies convince him that one of the significant facts regarding the after-history of war neurosis is the relative infrequency of psychotic developments.

Dr. Fenton's book is highly interesting and most readable. His discussion of the nature of war neurosis shows that his point of view is not only that of a psychologist; he gives a broad survey of the underlying problems, physiological and social and psychological. Many illustrative tables accompany the letterpress.

[4] *Shell Shock and its Aftermath.* By Norman Fenton, Ph.D. With an introduction by Thomas W. Salmon, M.D. London: H. Kimpton. 1926. (Roy. 8vo, pp. 173; 12 figures, 1 plate. 12s. 6d. net.)

## NOTES ON BOOKS.

DR. GROSSFELD undertook to write an introduction to a book on the analysis of foods[5] at the suggestion, as stated in the preface, of Geh. Regierungsrat, Univ.-Prof. Dr. phil., Dr. ing., h. c., Dr. ph. nat. h. h. c. J. König in Munster i. W. It brings together the various processes which are described in the larger textbooks as forming the daily work in the laboratory, and to present them in shortened form, but in sufficient detail to enable them to be carried out from the descriptions. The author has, he tells us, paid special attention to recent developments, and describes many new methods which do not appear in König's comprehensive work on foods; he would therefore

[5] *Anleitung zur Untersuchung der Lebensmittel.* Von Dr. J. Grossfeld. Berlin: J. Springer. 1927. (Sup. roy. 8vo, pp. xii + 409; 26 figures. R.M.22.50.)

appear to wish his book to be regarded as to some extent a supplement to the third volume of that work. Of the more recent matter may be mentioned a method of analysing wines, the trichlorethylene method of estimating the fat content of foods, a simplified method of estimating the lecithin-phosphoric acid constituent in eggs, requiring only small samples, a simplified method of calculating the alcohol content when present in small percentages, and the recently introduced pectin estimation, which has proved of importance in connexion with the preservation of fruits. In order to facilitate the often laborious calculations involved in analytical work a number of tables have been introduced dealing with the fat content, the nitrogen content, saponification, the refraction index, the sugar content, and many other matters. The first part of the work deals with methods generally; the second part with the analysis of the individual foodstuffs, their impurities and adulterations; and the appendix includes sixty pages of tables.

*Mosquito Reduction*[6] is a small book intended for those—particularly laymen—who are engaged in antimalarial work in India. It includes a general account of the causal agents of malaria, the biology, morphology, and habits of the mosquito, and the main outlines of preventive work. Appendixes on the hatching, preservation, dispatch by post, and the identification of the Indian species of anopheline mosquitos are also provided. Any attempt to cover such extensive ground within space so limited must of necessity be sketchy, but the authors have succeeded in providing an accurate survey of the main factors in an antimalarial campaign in a manner which can be easily understood and digested by an intelligent layman. The price (4s. 6d.) of such a small handbook seems to be rather high, and may prevent it securing the circulation it deserves.

In *Outwitting Middle Age*[7] Dr. CARL RAMUS, author of *Marriage and Efficiency*, has provided a book for popular consumption, which the preface assures the reader will change every mature person's outlook on life by showing that the bogy of middle age, if resolutely faced, can be driven forward into a receding future, the duration of which in years cannot be estimated at present. Much information is given on many points, including the causes and prevention of middle age, facts about foods, the glands of internal secretion, rejuvenation and Steinach's and Voronoff's operations, the influence of drugs, psychology, the climacteric, and historical cases of longevity, such as Ninon de Lenclos and of two living people, one of them Dr. Adolph Lorenz, the famous Austrian orthopaedic surgeon, who publicly stated in 1926 that when 67 years of age he underwent the Steinach operation, and advised every man over 60 and every man with early arterio-sclerosis to follow his example; Miss Fanny Ward seems also to have been freely discussed in the press. The literary style cannot conscientiously be described as pedantic or dull, for here is a quotation: "Psycho-analysis has already psyched almost everything worth psyching, and when it went into old traditions and folklore it found so many parallels with fantasy and day-dreaming that it took a kangaroo leap to the conclusion that *all* old stories and religious accounts were merely dreams and fantasies on large scales—racial compensation dreams."

The Honorary Secretary of the Library Association states that the publication of the *Subject Index to Periodicals, 1922*,[8] comprises 6,200 entries obtained from the examination of 300 periodicals. To review a restricted list of selected references to some of the subjects published more than four years ago comprised within the scope of the terms "science" and "technology" requires the reviewer to put himself in the position of an inquirer in a library concerning some one of the subjects included in the index. If the inquirer consults one of the periodicals referred to he will find further references made to his subject during 1922. Moreover, he will, with a little more research, discover other publications during the same period which relate to his subject. There would, then, appear need for an explanation, placed upon the forefront of such an index, as to the basis upon which the selection of such references has been made in order to induce a library to preserve the collection of references as of permanent value, although made some time ago.

[6] *Mosquito Reduction and Malarial Prevention.* By J. A. Crawford, M.B., Ch.B.Edin., Captain R.A.M.C., and B. S. Chalam, L.R.C.P. and S. Edin., L.R.F.P. and S.Glas. London and New York: Oxford University Press. 1926. (Cr. 8vo, pp. x + 102; 15 illustrations. 4s. 6d. net.)

[7] *Outwitting Middle Age.* By Carl Ramus, Surgeon U.S. Public Health Service. London: George Allan and Unwin, Ltd. 1926. (Cr. 8vo, pp. xi + 269. 7s. 6d. net.)

[8] *The Subject Index to Periodicals, 1922.* Issued by the Library Association. K: Science and Technology. London: Published by the Library Association; Agents: Messrs. Grafton and Co. 1926. (Med. 4to, pp. 271. £1 1s. net.)

## PATENTED RESEARCH.

IN an article under this title published a short time ago (March 12th, p. 479) reference was made to the action of Dr. George Dick and Dr. Gladys Dick in patenting the method they had elaborated for the recognition, prevention, and treatment of scarlet fever, and the wisdom of this course was called in question. They have now made a communication to the *Journal of the American Medical Association* for April 23rd, the last issue to reach this country, in which they explain the motive by which they were actuated. Their early researches were published in 1923 and 1924, and accounts of their results were given in this JOURNAL from time to time.

In the statement now published they say that it was suggested at about this time to them that a patent should be obtained in order to safeguard the quality of the materials sent out. At first they rejected the suggestion, but later on commercial firms began to distribute products undesirable on account of faulty methods of preparation, inaccurate standardization, or inadequate dosage. The action of these firms convinced them that some additional means of controlling the quality of the scarlet fever products ought to be found. After consultation with prominent members of the medical profession and with Government officials a patent was obtained. Its administration was placed in the hands of a committee composed of the director of the John McCormick Institute, where the research was done; two well known philanthropists who have made liberal donations to research, medical schools, and hospitals; the benefactor whose generosity was largely responsible for the development of scarlet fever antitoxin; the attorney who obtained the patent and who had consulted officers of the American Medical Association and had their approval before undertaking that work; a secretary; together with the two Drs. Dick, who would furnish technical advice as to the methods, standards, and dosage. "No member of the Scarlet Fever Committee," the statement continues, "receives any compensation for his services, with the exception of the secretary, who receives $25 a month." It is stated that during the first year and a half of its existence, the Scarlet Fever Committee secured the co-operation of four of the best American manufacturers, who agreed to distribute only those scarlet fever preparations which should meet the standards of the committee. It is stated further that when the application was made for the British patent (as reported in our columns on March 19th, 1927, p. 526) a licence was offered to one of the largest manufacturers in England, but that no answer was received. The preparations made by manufacturers licensed in America can now, it is stated, be obtained in England. With regard to the sale of the products "the Scarlet Fever Committee does not attempt to fix prices, believing that by not granting a monopoly, thus retaining the factor of competition, and wording the licence contracts so that with every reduction in price to the consumer the manufacturer reduces the sum paid the committee for testing his products, the lowest prices compatible with good quality and fair profit to the manufacturer will most quickly come into effect. This belief has been justified by the reductions in prices already made by licensed manufacturers." From the statement before us we learn that the committee maintains an organization for testing samples of every lot of each scarlet fever product manufactured by its licensees. Two health departments in the United States which made application received free licences. In addition, the committee has furnished without charge the materials and workers necessary to the control of a number of epidemics of scarlet fever in communities, schools, institutions, and hospitals. The committee also maintains research work directed towards the solution of technical difficulties and other problems connected with the control of scarlet fever.

We readily and frankly admit that, though the general principle involved raises considerations which are of serious and, it may even be, sinister importance, this statement is sufficient to show that, as we had hoped might prove to be the case, no charge against the investigators, Drs. George and Gladys Dick, of seeking to commercialize their method

for their own pecuniary benefit or that of any organization, can be sustained. They were in a difficult position, as others have been and will be, and no doubt took what they felt to be the best way out.

The *Journal of the American Medical Association*, in commenting on the statement by the Drs. Dick, writes:

Medical science and its discoveries for the relief of human ills should know no national boundaries. Nevertheless, the intricacies of modern commercial methods make necessary some means for protecting the discoverer and the public against those who would take undue advantage of both. The Insulin Committee of Toronto, the patents on thyroxin and on the scarlet fever preparations, have been attempts to find a way in the maze of commercial promotion and deceit. Perhaps none of these methods is satisfactory. Some organization—the American Medical Association, the British Medical Association, the Medical Research Council of Great Britain, or even the Chemical Foundation—should seek a means of giving the discoverer his due, throwing the products open to fair competition in manufacture, protecting the public, and prosecuting to the utmost those who undertake to go beyond the magnificent altruism of medical tradition for their personal gain.

That opinion in America on the advisability of patenting the application of results of research is not unanimous is shown by an editorial article in the *American Journal of Public Health* of last September, to which our attention has just been called. It states that the taking out of a patent by the Drs. Dick on the production of a scarlet fever toxin and antitoxin has led to a great deal of criticism.

No new bacteriological procedure was involved in their production. . . . Scarlet fever antitoxin was made in Vienna many years ago and used with success. . . . There does not appear to be anything strictly original in the method of growing the germ or the production of the serum, and one is indeed puzzled to understand how it was considered patentable. . . . It is well known that scarlet fever toxin and antitoxin are being produced by methods different from those put forward by the Dicks, and from cultures obtained from different sources, with results which are apparently equal in every respect to those obtained from material controlled by the Dicks, and the Scarlet Fever Committee, of which they are members. . . . There seems to be no reason for believing that preparations licensed by the Scarlet Fever Committee are or will be any better than those put out under the authority of the Public Health Service.

## THE ROYAL AIR FORCE.

### Report on the Health of the Force in 1925.

The report on the health of the Royal Air Force for the year 1925 deals with a total strength of 33,028, of whom 23,838 were stationed in the United Kingdom, 3,632 in stations of the Mediterranean littoral, 3,590 in Iraq, and 1,950 in India. The personnel in the Mediterranean littoral includes 2,092 in Egypt, 692 in Malta or on aircraft carriers, and 593 in Palestine. The disease and injury incidence is admirably analysed in a series of four chapters, with appropriate tables in each.

The incidence of sickness and injury, excluding minor cases of less than forty-eight hours' duration, amounted to 447.2 per 1,000 of the total force, as compared with 463.6 in 1924 and 494.8 for the previous three-year period. The death rate was 4.2 per 1,000, compared with 4.5 in 1924. The actual number of deaths was 138, and of these only 36 were due to disease, while 102 were due to injuries. This marked excess of deaths from injury as compared with deaths from disease is characteristic of the Air Force and significant of the risks of flying. The total number of injuries in 1925 was 2,239, or 67.8 per 1,000 of strength. The report gives a full and interesting analysis of these: 61 per cent. occurred on duty, and, as in previous years, the majority, 48 per cent., were injuries of the lower limbs, chiefly sustained in athletics. The number of flying casualties on duty was 155, as compared with 169 in 1924. They were comparatively fewer in 1921, 1922, and 1923, when the numbers were 86, 102, and 112 respectively. The deaths from flying accidents were 55, but, taken as a percentage of the total flying casualties—namely, 35 per cent.—they compare favourably with all these years, the percentage being 42 in 1921, 49 in 1922, and 41 in 1923 and 1924. Eight of the deaths were caused by collisions. There were 33 injuries and 1 death from handling or in connexion with airscrews, 43 injuries were from starting other engines, and 400 with 18 deaths from motor accidents. Parachute descents caused 5 admissions for injury, 1 of which was fatal. There were also 4 cases of wounds in action when an aircraft was shot down in Iraq, and also in India; all proved fatal. There were 5 deaths from drowning whilst bathing.

There is little to note in connexion with the incidence of disease. Venereal diseases have fallen from 22.3 per 1,000 of strength in 1924 to 19.9 in the year under review. The highest disease incidence, chiefly from influenza, diseases of the upper air passages, and of the digestive system, occurred amongst apprentices. A useful table indicates the case incidence according to age groups, the strength of each of which is shown. The age group under 18 shows an incidence of disease practically double that of other age groups, while the age group 24 to 25 shows the highest injury incidence.

In stations abroad Basrah proved the most unhealthy, as in previous years, with an admission rate of 922.4 per 1,000 of strength. Dysentery, malaria, and sandfly fever accounted for 60 per cent. of the admissions. The report notes that the prevailing type of dysentery in the stations abroad was protozoal in origin, thus emphasizing what has already been recorded regarding the prevalence of this type in Eastern countries. Two cases of primary infection with benign tertian type of malaria occurred in England at Eastchurch, neither of the patients having served abroad. It is stated that malaria is not uncommon amongst the civilian population of the district.

The final chapter of the report deals with miscellaneous subjects, such as the work of the Central Medical Board; the medical officers' school of instruction and research laboratory; the physical efficiency examination of officer and airman pilots, which takes place at the end of each year; the medical examination of recruits; hygiene and sanitation at home and on foreign stations; and a few other subjects, including transport of sick and wounded by air. On this last duty aircraft made 81 journeys in Iraq, carrying 176 cases, as compared with 81 cases in 1924, and flying 14,492 miles. It is only in Iraq that aircraft are employed as a routine procedure for this purpose. Several types are used, including specially constructed ambulance aeroplanes for sitting or stretcher cases and attendants; 126 of the 176 cases were carried in these.

The report as a whole maintains the high character of the annual reports of the medical department of the Royal Air Force, and contains statistics, such as incidence of disease and injury according to strength of each age group, not found in the reports of the health of the Army or Navy. It is also of interest to note that the success of the Air Force in the prevention of sandfly fever in Malta, in accordance with the methods recommended by the R.A.F. Sandfly Commission of 1922, continues; and that considerable activity is displayed in connexion with pathological work in Royal Air Force laboratories. Clinical laboratories were established in 1925 in the R.A.F. hospitals at Halton and Cranwell in England, and at Hinaidi, Basrah, Mosul, and Ludd abroad. The central laboratory was moved in January from Finchley to Halton as a separate unit, and designated the R.A.F. Pathological Laboratory, to act as a centre for the clinical laboratories.

## PATHOLOGICAL RESEARCH UNDER THE METROPOLITAN ASYLUMS BOARD.

### Opening of New Laboratories by Minister of Health.

The new research and pathological laboratories of the Metropolitan Asylums Board, situated at Park Hospital, Hither Green, were opened by the Minister of Health on May 9th. These laboratories have been built as part of a plan of reorganization of the research and pathological services upon which the Board embarked in 1924. It was then decided to transfer certain of the laboratory work hitherto carried on at Belmont, in Surrey, to laboratories attached to "acute hospitals," and in the first place to institute two group laboratories, one in the north and the other in the south of London, each to serve the needs of several hospitals by carrying out work requiring special technique and undertaking original research. A temporary building has been adapted at the North-Eastern Hospital to serve as the northern group laboratory, and the new laboratories at the Park Hospital will form the southern group laboratory and be the headquarters of the Board's director of research and pathological services. Routine bacteriological examinations will be carried out at each of the Board's hospitals, but such work as virulence tests, section cutting, blood culture, and the preparation of vaccines will be undertaken at the group laboratory, as well as investiga-

tions requiring animal inoculation. The laboratories are intended for research into the primary causation of the diseases from which the inmates of the Board's institutions are suffering, and as the largest section of the Board's work is the provision for cases of infectious disease the laboratories have been built in association with a fever hospital. Arrangements have been made whereby voluntary workers can be granted facilities for research in the laboratories.

The laboratories, which are separate buildings in the grounds of Park Hospital, comprise a main block for the laboratory proper, with a lecture room for medical students attending the hospital for instruction in fevers, and, at a little distance, an animal house. On the ground floor of the main building are a media room, opening from which are sterilizing and centrifuge rooms, and a cold and a hot room. The cold room, insulated with slab cork, has a mean temperature of 32-37° F., and the hot room is kept at 98.4° F. by means of a steam pipe. On the first floor are offices and smaller laboratories, a section-cutting room, and a photographic department. The animal house has pens for stock rabbits and guinea-pigs, an experimental room with individual cages of galvanized iron, and a small inoculation room in which experiments are done and autopsies on animals performed. In the equipment of the laboratories several improvements have been introduced into the standardized types of apparatus to secure ease of working, and binocular instruments have been provided as far as possible to prevent eye fatigue. The total cost of the buildings, together with fittings and equipment, has been about £13,500.

At the opening ceremony the chair was taken by Mr. Francis Morris, J.P., chairman of the Board, and other members and officials were on the platform, including Dr. F. H. Thomson, chief medical officer of the infectious hospitals service, Dr. J. E. McCartney, director of research and pathological services, and Dr. T. H. Woodfield, medical superintendent of Park Hospital. The Chairman said that in the infectious diseases work of the Board, which was carried on in sixteen hospitals containing 8,800 beds, all sorts of problems had to be faced. He gave as an illustration the recent rearrangement of the provision for measles and for scarlet fever in view of the fact that the common type of scarlet fever seemed to be growing milder and the common type of measles more virulent. The Board had followed the plan of the general hospitals in giving as many facilities as possible for the education of students at the various institutions. It had also devoted itself for many years past to the subject of prevention. In 1909 it began the work of serum production at Belmont, and in 1913 appointed a research pathologist to inquire into the causation, infectivity, prevention, and treatment of zymotic disease, and to keep in touch with the medical superintendents of the various infectious diseases hospitals with a view to elucidating the primary factors in the causation of the diseases from which the patients in the hospitals were suffering. This research pathologist was provided with a laboratory at first at the Lister Institute and later at the National Institute of Medical Research. In 1921 the Board, after consultation with the Medical Research Council, set up a scientific advisory committee, of which Dr. F. H. Thomson was chairman, to exercise general supervision over the research work carried on by the pathologist, and over the diphtheria antitoxin and bacteriological laboratories. It was following upon a report from this committee that the present developments had ensued. He expressed thanks to Sir George Newman and Sir George Buchanan, of the Ministry of Health, and Sir Walter Fletcher, of the Medical Research Council, for much valuable advice and assistance, and said that the Board was anxious that the new laboratory should be used, not for routine work, but for fundamental discovery.

Mr. NEVILLE CHAMBERLAIN said that vast as was the institutional provision made by the Metropolitan Asylums Board it could not be said to be too large. Last year in London, apart from tuberculosis, 33,000 cases of infectious disease were notified. The Board was known throughout the country as a model of administration, but the maintenance of these hospitals was a very expensive matter, and meant a substantial addition to the burden of the rates which was bearing so heavily upon the urban dweller. Mr. Chamberlain drew an allegory from his own experience as a manufacturer before he went into politics. One of the problems which he had constantly to face in his industry arose out of the presence of flaws in the material which were not discoverable until a considerable amount of money and labour had been spent in production. To find a means of discovering flaws at the earliest stage and of eradicating them was the continual concern of the manufacturer. Much the same thing applied in the infinitely more complex mechanism of human life. About 5 per cent. of the children born in London died from one of the infectious diseases before reaching adult age, while among those who survived there was an unknown proportion of crippling and disablement. If that wastage could be prevented it would mean—dismissing for the moment higher considerations and sentiments—a substantial decrease in the responsibilities of public bodies, and incidentally in the precepts which they were compelled to make upon the ratepayers. He thought it somewhat extraordinary that research upon the cause of infectious diseases should have been so late in arriving. Years ago, as a member of a public body, it was his duty from time to time to inspect an infectious diseases hospital, and he remembered that on the occasion of his first visit he asked the very clever and bright young gentleman who accompanied him to tell him what was the cause of scarlet fever. "Judge of my consternation when I found that I had bowled him out first ball." Even now it was not certain that the cause of scarlet fever had been ascertained. Some medical men thought that the villain of the piece had been discovered, others were of opinion that the wrong party was suspected, and there was still much to be done in the way of research. The average stay in hospital of a scarlet fever patient was eight weeks. If research could diminish the period by one week it would mean no small relief in a work of such dimensions as that of the Board. As a layman he was compelled to speak in non-technical terms with regard to the recent work on the building up of the defensive mechanism against scarlet fever; it seemed to him that an army of "anti-reds" was being trained to assist the regular forces of the patient's constitution. In diphtheria the guilty party had been arrested, tried, and convicted, and there a material advance had been made in immunity and in checking and controlling outbreaks of the disease. The case mortality from diphtheria in London at the beginning of the century was about 13 per cent., and to-day it was down to below 4 per cent. He would not say that that was all due to these discoveries, but nobody could doubt that they had played a considerable part in this reduction. To his mind the results achieved in these two diseases—scarlet fever and diphtheria—were sufficiently encouraging to enable it to be said that the money spent upon the provision of facilities for research was a good investment. The laboratories were not imposing, either in size or ornament; they were workmanlike buildings, but with the eye of imagination it was possible to see them in the light of the great achievements of which they might be the home. Here might be won some of those victories which, though they did not ring round the world like Waterloo, nevertheless had their deep and permanent effect upon the happiness and prosperity of the human race. As Minister responsible for the department whose chief object was to reduce the necessity for having such a Minister at all, he commended the work, and congratulated the Board on the vision and imagination which had led it to plan this enterprise.

The thanks of the Board to Mr. Chamberlain were conveyed by the Rev. Canon SPRANKLING, chairman of the Infectious Hospitals Committee, and Sir D'ARCY POWER, a member of the Board. Among others present at the ceremony were: Sir George Buchanan, Sir F. W. Andrewes, Sir Walter Fletcher, Lieut.-General Sir M. H. G. Fell, Professors C. J. Martin, A. E. Boycott, and L. S. Dudgeon, Dr. Andrew Balfour, Dr. T. Carnwath, Dr. Morley Wenyon, Dr. Foord Caiger, and the mayors, medical officers of health, and town clerks of Lewisham, Camberwell, and other metropolitan boroughs.

# SIXTH BRITISH CONGRESS OF OBSTETRICS AND GYNAECOLOGY.

(*Continued from p. 844.*)

## The Cancer Problem in Gynaecology.

The second day of the congress was devoted to various papers and short discussions. Professor Archibald Donald presided over the morning session, which was opened by Dr. W. P. Graves of Baltimore, who read a paper on the cancer problem in gynaecology.

Dr. Graves said that the object of his paper was to promote a more intelligent prophylaxis in treatment of those forms of cancer and pre-cancerous states related to gynaecology. In the combat against any given disease three factors had to be dealt with—namely, the primary cause, the exciting cause, and the cure. The primary cause of cancer was as yet unknown, but in many cases the exciting cause was certainly the prolonged irritation caused by discharges from neglected lesions or trauma. Cure was only obtained by surgery or irradiation, and for this early diagnosis was essential. Dr. Graves referred to the preponderance of cases of carcinoma of the cervix following injuries due to pregnancy, and to the frequency of previous uterine or cervical lesions in those cases occurring in nulliparous women. When no previous pathological factor was present he could only postulate an hereditary predisposition. As regards prophylaxis he had found that out of 5,000 cases where cervical lacerations had been repaired, only two had developed carcinoma of the cervix; he advocated early repair of cervical lacerations in all cases, since carcinoma, as shown by Leitch, might develop long after the source of irritation had ceased. Dr. Graves described several cases of carcinoma of the corpus uteri where the lining epithelium of the uterine cavity must have been subjected to the influence of a pent-up irritating secretion for a long period prior to the onset of carcinoma. This, he maintained, was the causative factor in the onset of carcinoma. In the same way he thought that the irritation caused by the contents of an ovarian cyst might convert an originally benign type into a malignant one. Similarly a discharge from the upper genital tract might give rise to a pre-cancerous and later to a cancerous condition of the vulva. He pleaded for early surgical treatment of all gynaecological conditions which might be the precursors of carcinoma.

Professor Blair Bell (Liverpool) endorsed Dr. Graves's views, and advocated that all women at and after the menopause should undergo periodic examination with a view to early detection of carcinoma. Sir Ewen J. Maclean (Cardiff) was not optimistic about the surgical possibilities in the cure of cancer. Of all the patients he had operated upon for carcinoma of the cervix only one was alive ten years subsequently. Dr. T. W. Eden (London) agreed that all energies should be concentrated on diffusing knowledge that would bring cases of malignant disease to the surgeon at an early stage. Professor Lowry (Belfast) referred to the importance of educating the general practitioner in this respect. Dr. Allan Fothergill (Edinburgh) thought that a routine examination such as was suggested by Professor Blair Bell would result in widespread cancerphobia.

## Sudden Death Caused by Manipulation of the Pregnant Uterus.

Sir Bernard Spilsbury (London) read a paper on sudden death due to manipulation of the uterus during pregnancy. He stated that in these cases death had occurred in circumstances pointing to an attempt to procure abortion. In the majority death had followed the injection of fluid into the uterus, partly separating the membranes. In two cases the introduction of an instrument into the cervical canal had proved immediately fatal, and in a third case the instrument had been passed into the body of the uterus. Death was caused in one case by the removal of a rubber tube which had been inserted into the cervical canal on the previous day. In not one case was serious disease found to account for death, and in the majority no disease could be found even on microscopical examination of the organs. The conditions leading to these fatalities were: (1) the emotional state of the woman at the time of the attempt; (2) shock caused by the manipulation; this appeared to be a reflex vasomotor paralysis, producing a rapid fall in blood pressure.

Dr. A. Donald (Manchester) commented on the surprisingly slight incidents which sometimes caused death. Professor W. Fletcher Shaw (Manchester) thought careful consideration was necessary before accepting Sir Bernard Spilsbury's views. The cause of death had not been proved, and an important factor—the possible after-effects of drug taking—had been omitted. Professor R. W. Johnstone (Edinburgh) suggested air embolism as a possible cause of death in some cases. Professor Beckwith Whitehouse (Birmingham) said that no comparison could be made between these cases and those of legitimate practice, in which the extreme emotional state was absent; this was an important factor in sudden death. Sir Bernard Spilsbury, in reply, said he had never seen a case of air embolism following abortion, and doubted very much whether it occurred. He also emphasized the necessity of associating the medical findings with the criminal history and admissions. He compared these deaths with those which occasionally occurred on passage of a catheter. The possibility of degenerative lesions in the organs due to the taking of drugs could not be excluded.

## The Use of Pituitary Extract and Ergot in Labour.

At the opening of the afternoon session, with Professor R. J. Johnstone (Belfast) in the chair, Dr. Aleck Bourne (London) read a joint paper, prepared by himself and Dr. J. H. Burn (London), on the dosage and action of pituitary extract and of the ergot alkaloids on the uterus in labour, with a note on the action of adrenaline. The direct method of measuring and recording intrauterine pressure by means of a water-filled bag connected with a mercurial manometer and writing point on moving paper had been employed to estimate the action and dosage of pituitary extracts and the ergot alkaloids at Queen Charlotte's Hospital. The paper, which was illustrated by lantern slides of graphs and tracings, showed that a dose of two units of pituitary extract was safe and efficient during the later stages of labour. While the strength of the extract made by different manufacturers varied at present, it would be compulsory after August, 1927, for the containing ampoule to show the number of units. Of the three alkaloids of ergot, it was found that tyramine had no effect on the uterine musculature, while histamine produced a small but rapidly induced increase in the frequency and force of uterine contractions when given in large doses. The effect was short-lived, and left the uterus in a condition of atony. Ergotamine caused a slow but prolonged state of uterine tonic contraction. Adrenaline given intravenously was found to induce a short period of complete uterine inhibition.

## Deep *X*-Ray Treatment in Gynaecology.

Dr. L. Cassidy (Dublin), in a paper on deep *x*-ray treatment of non-malignant gynaecological conditions, said that small doses of *x* rays produced a marked increase in cellular activity. From the practical standpoint two factors entered into consideration: first, the changes in cells and organs subjected to *x* rays, and secondly, the generalized effect upon the blood and nervous system. For hypomenorrhoea he advocated small stimulating doses to the ovaries. In a few of these cases radiation of the hypophysis had given very satisfactory results. In cases of complete amenorrhoea due to endocrine deficiency menstruation had returned in four cases after treatment by *x*-ray applications to the ovaries or hypophysis. In the same way, out of 20 patients with dysmenorrhoea and scanty menstruation, 10 had been cured and 4 much improved by radiation of the ovaries or hypophysis or both. For the polymenorrhoea of puberty and the menopause he recommended splenic radiation, and added that in menopausal bleeding unrelieved by splenic radiation cure could easily be effected by full doses applied to the ovaries. He also advocated small doses of *x* rays for abdominal and pelvic tuberculosis and for parametritis.

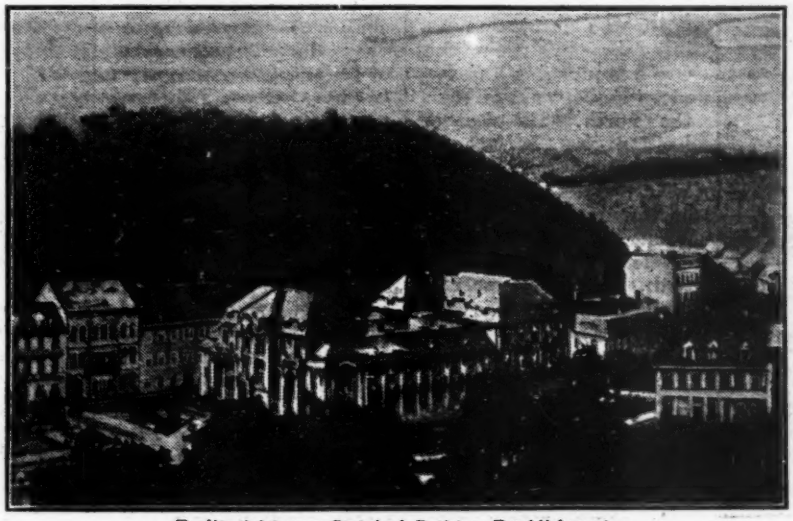
(*To be concluded.*)

# THE SPAS OF CZECHOSLOVAKIA.

## A MEDICAL TOUR OF PRAGUE AND THE HEALTH RESORTS.

JUST over a year ago the International Society of Medical Hydrology held its annual meeting in Czechoslovakia, in response to invitations from the Government and the spa municipalities of the new Republic. The members, numbering about 80, of whom a third were British, spent a week in visiting Prague and some of the chief watering-places of Bohemia and Slovakia.

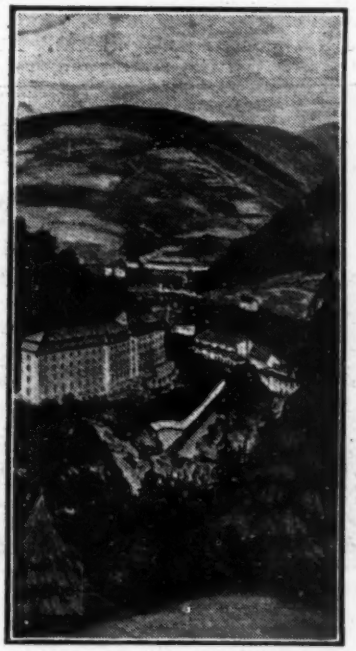
This spring another party of British medical men, with a leavening of writers, made a longer tour of that country as the guests of the Society of Czechoslovak Spas, travelling day by day through the western spas to Prague, and thence eastwards to the Tatra Mountains on the Slovak-Polish frontier. In the course of a crowded fortnight they passed three nights in the capital, and examined, all too perfunctorily, a dozen health resorts. At every halting-place they were met by the leaders of the local profession and the civic authorities, whose kindness knew no bounds, and special facilities for travelling within the Republic were granted by the Government through the good offices of the Minister of Public Health and Physical Education, two of whose staff accompanied the party. Some acknowledgement of these and other courtesies will be made presently, and all that need be said now is that the organization of the tour, from beginning to end, was beyond praise.



Teplitz-Schönau: Steinbad Bathing Establishment.

Czechoslovakia has been termed the land of spas, and apart from its natural charm and the architectural beauty of its capital the country has much to interest medical visitors. Nearly every branch of balneological practice can be studied on the spot at one or other of its watering-places; sanatoriums for the treatment of tuberculosis and other diseases abound in the Tatra Mountains; and Prague, with its universities, hospitals, clinics, and medical societies, is a great centre of professional teaching and scientific research. In this and later articles we shall give a brief account of the places seen, mainly from the medical point of view. A note on Czechoslovak Medicine appeared in the BRITISH MEDICAL JOURNAL of February 26th last (p. 396).

Of the many and varied spas scattered throughout the plains and highlands of Czechoslovakia a large part are municipal undertakings; others, such as Tatranska Lomnica, Strbské Pleso, and Jáchymov, are State-owned; and a few, like Pistany, are leased to private enterprise. Their names are now written in Czech, a language far too difficult for most foreigners, and it is not easy at first to recognize Carlsbad, Marienbad, Franzensbad, St. Joachimstal, and Teplitz-Schönau, under their new official designations of Karlovy Vary, Márianské Láznĕ, Frantiskovy Lazne, Jáchymov, and Teplice-Sanov. These five mineral water stations lie in the north-west corner of Bohemia, and the first three at any rate, although renamed by order of the Czech Government, are still predominantly German. On the other hand, Poděbrady, within an hour's railway journey of Prague, is and always has been Czech through and through, while the "atmosphere" of Pistany and the health resorts of the High Tatras is almost as Slovak as their language. The first draft of the itinerary included a trip to the Moravian spa, Luhacovice (formerly Luhatschowitz), near the Hungarian frontier, but this was omitted out of consideration for the already hard-driven travellers; otherwise everything went very much according to plan. Most of the places were as yet scarcely out of winter clothes, so that their attractions in the high season had to be taken on trust.



Jáchymov: Radium Palace Hotel and Baths.

The expedition left London on the morning of Thursday, April 14th, and returned on the night of Sunday, May 1st. Its route lay through Harwich, Flushing, Hanover, Leipzig, and Dresden. A railway accident near the Dutch frontier caused twelve hours' delay on the outward journey, and Good Friday was spent in travelling through Holland and Germany. At the Czech frontier town of Podmokly (Bodenbach) the visitors were met by Dr. Karel Driml, on behalf of the Minister of Health. Thereafter a special coach carried them on all their travels over the railway system of the Republic, with Dr. Driml and Mr. Zlaml (in charge of transport and hotel arrangements) as their guides and constant companions.

### *Teplice-Sanov and Jáchymov.*

These two spas, the first on the programme, have little in common beyond the radio-activity of their waters. Teplitz-Schönau, to give it the more familiar German name, is the oldest health resort in Czechoslovakia, with a history going back to Roman times and beyond. Its hot alkaline springs were very fashionable 120 years ago, and many illustrious names may be found in the archives. The well ordered bathing establishments are used for the most part by patients with chronic rheumatic and gouty disorders. The town is pleasantly placed, about 730 feet above sea level, in a wide valley sheltered by hills. From May to September is the best time for a visit, though the baths are said to be open all the year round; the Kurgarten must be delightful when the leaves are on the trees. After looking over the main bath-house and theatre the visitors were entertained to lunch by Count Clary, who welcomed them in perfect English in the name of the municipality and of his family, which has been closely linked with Teplitz-Schönau for 300 years.

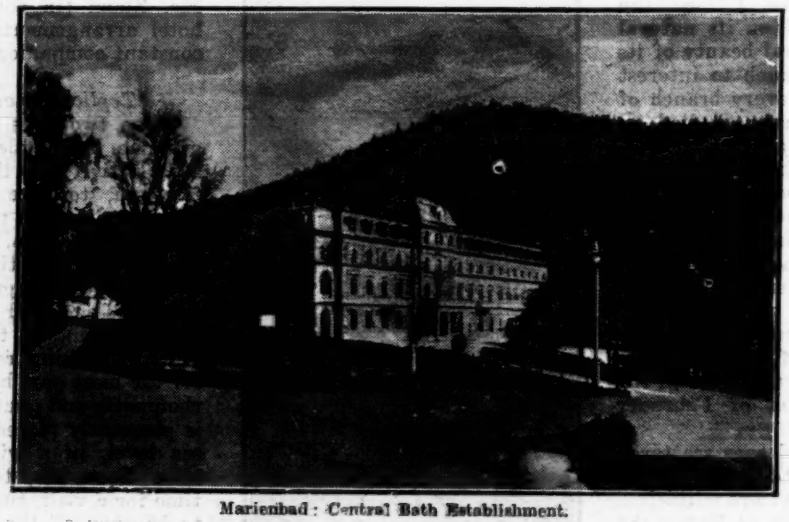
Jáchymov (formerly St. Joachimstal) was reached in driving snow after a journey by train and car. Parts of this little winding one-street town are old, but the spa

is quite modern. The mines are historically interesting for two reasons: "dollar" and "thaler" (Joachimstaler) owe their name to the silver extracted and coined there early in the sixteenth century, and in 1898 radium was first obtained by Pierre and Madame Curie from the waste of Joachimstal uranium ore. The discovery in 1905 of a briskly radio-active spring (600 mache units to the litre), in one of the uranium mines, led to the building of a bath establishment, and later of a large hotel and an irradiation pavilion—all now owned by the State. Jáchymov, though not at any great height, must be reckoned a hill station, with the Ore Mountains rising picturesquely above it to the north. Its doctors have profound faith in the healing virtues of the water, whether applied outwardly or drunk or inhaled; and even a single hot radio-active bath, as any visitor can prove for himself, is distinctly refreshing. The Radium Palace Hotel, a fine building on a fine site, is immediately opposite the baths.

Carlsbad: the Hirschensprung.

*Carlsbad, Franzensbad, Marienbad.*

A short motor run from Jáchymov on Easter Sunday took the travellers to Karlovy Vary (Carlsbad), the largest and most important watering-place in the Republic, best seen as a whole from the high ground near the railway station. Carlsbad, at an altitude of some 1,200 feet, is a considerable town straddling the Tepla gorge and enclosed on each side of the river by parks and wooded hills. It is a palatial spa, so well known that there is really nothing new to be said about it. The mineral springs and bath establishments lie along the course of the river, into which the waste water runs, disclosing its presence by clouds of steam. Some of the springs are hotter and therefore less gaseous than others, but the chemical constitution of them all is much the same. The chief salts are the sulphate, bicarbonate, and chloride of sodium, and of the various springs the hottest and the most famous is the Sprudel, gushing up in the pump room, at a temperature above 160° F., to a height of 20 feet. Each water drinker walks off with his ration and lets it cool before he sips it and goes for his morning promenade. Nevertheless, as Ernest Hart wrote in these columns forty years ago, the problem which remains unsolved is what part the Carlsbad water really plays in the Carlsbad cure. Of the various bathing establishments that styled No. 1 is superbly appointed and has a large hall fitted with Zander apparatus. Luxury is still the keynote of Carlsbad and prices run high, but besides the thirty-five hotels for the rich there are innumerable boarding houses for poorer folk with livers just as large. The party from England were entertained at a banquet presided over by Dr. Wagner, and next morning Dr. Paul Meyer and Dr. Edgar Ganz showed them round the baths and other attractions of the place.



Marienbad: Central Bath Establishment.

Frantiskovy Lazne, or Franzensbad, is a garden spa 300 ft. higher than Carlsbad, charmingly situated among open moorlands. The bathing establishments, hotels, and pensions are modern and well managed. There are eighteen different cold mineral springs, one of them extremely rich in sodium sulphate, another very pleasant as an ordinary sparkling table water, and a third much used in anaemia for its saline chalybeate properties. A very large proportion of the patients who go to Franzensbad are women. The principal outward treatments are by peat baths (the material being found locally in great abundance) and by natural carbonic acid baths. Therapeutic indications and methods were described by members of the local profession during the tour of the baths, and Professor Zörkendörfer gave an instructive account of the chemical and physical properties of the waters. After a luncheon party in the Kursaal the visitors were driven by car to Eger, and thence took train to Marienbad, carrying with them a very agreeable memory of Franzensbad and its inhabitants.

Franzensbad: West End Park.

Marienbad (Márianské Lázně), 2,000 feet above sea level, near the Saxon and Bavarian frontiers, lies in a broad valley enclosed by pine forests. Here in a beautiful setting the wealthy and full-blooded patient may deplete himself under skilled advice, the action of the cold sulphated alkaline waters being smoothed by every amenity that money can buy. The baths of this famous spa are indeed magnificent. At the local Balneological Institute the virtues of the springs were expounded from the clinical aspect by Dr. Max Porges, and from the chemical and physiological by Professor Zörkendörfer, who had travelled with the party from Franzensbad. Later in the evening a dinner, given by the municipality and the baths administration, was presided over by the Burgomaster. Next morning, after an inspection of the wells and baths, some of the party walked to the factory where the water from the Ferdinand spring is evaporated and the salt bottled for export. The general idea gained during a too brief stay was that those who can afford its prices, and whose tastes and figures turn outwardly so to speak, will long continue to regard Marienbad as the ideal inland watering-place on the continent of Europe.

Subsequent notes will deal shortly with some of the medical institutions of Prague, and with Poděbrady, Pistany, Trencsénteplicz, and the High Tatra health resorts.

British Medical Journal.

SATURDAY, MAY 14TH, 1927.

## THE CONSTITUTIONAL FACTOR IN DISEASE.

DURING this century the word "constitution," previously employed more by the lay public than in a definite professional sense, has by a swing of the pendulum come back into medical parlance, and this in two different connexions. Epidemiologically Hamer, Greenwood, and Crookshank have revived interest in Sydenham's "epidemic constitutions" of diseases, a further development of Hippocrates's views, and a rather mysterious conception of some influence—climatic or telluric—independent of the resistance of the host and of variations in the infecting agent. This, according to Professor Major Greenwood, meant that upon distinct epidemic diseases there was superimposed a common external form or group of allied forms. The other use of the word "constitution" is nearer that generally understood—namely, as applied to the individual. This was much in vogue before the advent of bacteriology, and was embodied in the teaching of John Hunter, Thomas Addison, Thomas Laycock, and Jonathan Hutchinson. But, like the interest in the closely allied subject of the diatheses, that in constitution, or the bodily make-up of the individual, waned before the etiological promise of bacteriology, which diverted attention from the internal and hereditary factors to the external causes of disease. This phase, however, lasted for a time only; Kraus at his anthropological clinic in the Charité Hospital in Berlin applied the methods of anthropology to the investigation of human constitution, which Knud Faber[1] defines as "the nature of the body, including under this all inherent properties, such as the anatomical structure of the body, its morphological composition, as well as the functioning properties of the separate organs and cells." Constitution therefore includes hereditary variations from the average both in structure and in function, and of the latter Sir Archibald Garrod's inborn errors of metabolism are a good example; these may obviously be advantageous, harmless and of no importance, or with pathological effect. Although Emerson confirmed the proverbial phrase that "every definition is dangerous," clear thinking depends on an understanding and accurate use of terms, and it may be well to have a distinct notion of the relation of "diathesis" to constitution. Sir Jonathan Hutchinson regarded diathesis as "any bodily condition or prolonged peculiarity of health giving proclivity to definite forms of disease," or, more briefly, as "a persisting morbid proclivity." If this interpretation be adopted, diathesis may be considered to be much the same as a morbid constitution. George Draper has been working on the same lines as Kraus for some six years at the Presbyterian Hospital, New York, and regards constitution as "the aggregate of hereditary characters influenced more or less by environment, which determines the individual's reaction, successful or unsuccessful, to the stress of environment." By means of anthropometric methods previously employed to differentiate the races of mankind he has separated out distinct types for diseases, such as peptic ulcer, gall-bladder affections, high blood pressure and chronic nephritis, pernicious anaemia, asthma, tuberculosis, and acromegaly.

Dr. Arthur Hurst, like Sir Samuel Wilks, his predecessor at Guy's Hospital, is a faithful follower in the steps of Thomas Addison, whose researches he has pursued on present-day lines. He delivered in Paris in October, 1922, two lectures on gastric diatheses, and recently at Belfast gave a much expanded account of "The constitutional factor in disease" in the address the publication of which is completed this week. He passes in review the three gastric diatheses, the constitutional basis of Addison's anaemia, commonly called pernicious, and subacute combined degeneration of the spinal cord, of cholecystitis, diabetes, nephritis, phosphaturia and phosphatic calculi, high and low blood pressure, and of asthma, epilepsy, and migraine. In connexion with the frequently described conditions of the hypertonic stomach and the dropped stomach he insists that these *x*-ray appearances are merely anatomical variations from the average length of the healthy organ, which may normally—that is to say, without producing symptoms—oscillate between 18 and 84 cm. Dr. Hurst deals mainly with functional constitutional phenomena rather than with structural variations, and shows how they favour the incidence of disease. An example is afforded by what he calls the hypersthenic gastric diathesis, the subjects of which are prone to suffer from a duodenal ulcer; whereas the 4 per cent. of normal persons with constitutional achylia gastrica are, from the absence of the antiseptic barrier provided by the healthy stomach, disposed to infection by bacteria contained in food and drink, and so to Addisonian anaemia and subacute combined degeneration of the spinal cord. In speaking of the hereditary factor in diabetes mellitus he argues that the prolongation of life and health in adult diabetics by insulin will result in a great increase in their progeny and so to a larger incidence of the disease. He maintains also that the constitutional inherited liability of the islands of Langerhans to undergo degeneration is associated with a tendency to excessive stature in childhood and obesity in adult life. Martin H. Fischer[2] of Cincinnati has argued that nephritis and its results are due to an increased production or accumulation of acid in the kidney, and Dr. A. A. Osman has shown that individuals with highly acid urine, which may reasonably be regarded as depending upon the constitutional and inherited variations in the complicated biochemical processes responsible for the reaction of the urine, are specially prone to suffer from acute nephritis. Conversely, some persons have a constitutional tendency to pass alkaline urine, which is exaggerated by mental strain and excitement; this condition naturally favours the formation of phosphatic calculi. Though it is generally recognized that high blood pressure is hereditary, yet it is commonly assumed that there is some toxic factor behind it; Dr. Hurst's contention, supporting the conclusions of Draper and others, that there is a constitutional liability to it, is therefore attractive. Similarly the opposite state of hypopiesia is regarded as a constitutional condition or diathesis and as merely an extreme variation from the average. Asthma, epilepsy, and migraine, which present considerable resemblances, are all regarded as depending on a constitutional and often inherited irritable focus in the brain; it has sometimes been stated that they are interchangeable in generations and members of the same family, but Dr. Hurst does not accept that; his conclusion is that their

[1] Faber, K.: *Nosography in Modern Internal Medicine*, p. 198, 1923, New York.

[2] Fischer, M. H.: *Oedema and Nephritis*, 1921.

several constitutional bases, though somewhat alike, are specific.

Obviously the practical importance of recognizing the constitutional factor in disease is that it will encourage the physician to antagonize the tendency, and so to carry out the principle of preventive medicine. On the importance of these prophylactic measures and on their nature Dr. Hurst is emphatic and clear. Thus the brothers, sisters, and children of patients with Addisonian anaemia, subacute combined degeneration of the spinal cord, and William Hunter's glossitis should be given test meals, and, if found to have achlorhydria, should, like all those with this deficiency, be given a drachm or more of dilute hydrochloric acid fasting three times a day for the rest of their lives; it may be well to add that if combined with sweetened orangeade or syrup of grenadine the beverage is quite palatable. A patient who, as shown by a blood count and Hijmans van den Bergh's test, has apparently recovered, should however well he may feel, nevertheless continue to take the acid, as the constitutional predisposition is there, and a relapse, due to fresh infection, may occur. Another clear indication is the correction of excessive acidity of the urine, especially during scarlet fever, by potassium citrate and sodium bicarbonate, a plan which in practice almost entirely prevented the occurrence of albuminuria and nephritis among 431 cases of scarlet fever. Of the treatment of asthma Dr. Hurst can unfortunately speak with great authority; of this, as of migraine and epilepsy, he epigrammatically remarks that "the only cure is not to have it"; there is not any drug, such as luminal in epilepsy and migraine, which has a favourable influence on the constitutional factor in asthma. This address, like all Dr. Hurst's contributions, is noteworthy for its power of stimulating thought, its logical acumen, and practical application.

## SYNTHETIC DRUGS.

THE introduction of synthetic drugs has been the outstanding feature of pharmacology and therapeutics during the present century. The process started in the second half of last century and has gone on with ever-increasing rapidity, reaching its full development during the last two decades. Probably few, even of those who give special attention to the subject, are aware of the enormous number of synthetic drugs on the market; some idea may be gathered from the fact that the index to the new edition of Fränkel's well known book on drug synthesis[1] contains the names of some 7,000 chemical substances. It is also interesting to note that this new edition is not larger than the last, because the author has been able to delete a great deal of matter which has come to possess historical interest only; that is to say, of the drugs enumerated in the last edition, which was published in 1921, a large number have ceased to be of any practical importance. This is partly due to the fact that advancing knowledge has led with fair regularity to the abandonment of hypotheses that were popular for a time. The search for new synthetic drugs is now systematically conducted on a large scale, and on a well understood plan, in big drug factories. Long series of chemical compounds are prepared and their pharmacological properties systematically tested. Only a small proportion of these prove to have any therapeutic value, and only a few even of these become established in the favour of the profession. Work of this kind is done chiefly by German and Swiss chemical firms, who have organized the search for new drugs on a scale unknown elsewhere. Consequently, the majority of new synthetic drugs come from these countries. It is obvious that if organic chemists and pharmacologists, working together as a team, are backed by the facilities and resources of great factories they must have opportunities completely beyond those of any ordinary university department. While it must be admitted that this commercialized research has undoubtedly done great service in producing valuable drugs, yet it has created certain special problems for the medical profession. The nature of these problems may be illustrated by one or two important classes of drugs; for example, Fränkel has had to devote thirteen pages to the description of derivatives of barbituric acid. Some hundreds of compounds are mentioned and references are given to about 140 patents. About forty compounds of this class of hypnotics have been advertised to the medical profession, among the best known of which are veronal, luminal, and dial. Another instance is afforded by the organic arsenicals. Fränkel's account of them occupies fifty pages; some hundreds of compounds are mentioned and references are given to 300 patents. In both these instances the organic chemists have produced a great many compounds, most of them protected by patent rights, and each series contains a large number of closely related chemical substances possessing very similar pharmacological actions.

Only a minority of these compounds are introduced to the medical profession, but even so the number of new proprietary remedies advertised is embarrassingly great; the reason for this state of affairs is obvious, for the manufacturing firms naturally wish to cover the cost of expensive research departments. The number of new synthetic drugs which represent striking advances in therapeutics is small, and consequently any compound presenting properties sufficiently novel to make it worth while to patent it, or showing any promise of being a slight improvement on existing drugs, has an excellent chance of being introduced to the medical profession. Usually manufacturers are able to back up their recommendations by reports of successful trials of the new drug in some hospital—a phenomenon which raises other considerations on which we do not now propose to enter.

Unfortunately the process is one-sided, for, on the one hand, any new proprietary drug has powerful advocates in those interested in its success, while, on the other, there is no mechanism for giving the medical profession a completely unbiased judgement on its merits. There appears, indeed, to be a danger that the organic chemists may hinder the progress of therapeutics by a very excess of zeal, for if the clinician has only the choice of a few drugs to produce a given therapeutic effect, it is possible for him to make a careful comparison of their efficiency, but if he is confronted with dozens of new compounds, all claiming exceptional merit, he will probably regard the task of adjudication as hopeless and will stick to the drugs possessing old-established reputations.

Another question of general interest is the increasing therapeutic importance of compounds protected by patents. Already synthetic drugs have replaced natural drugs to a large extent, and this process is certain to continue; moreover, the majority of new synthetic drugs owe their existence to what we have

[1] *Die Arzneimittel-Synthese.* Von Dr. Sigmund Fränkel. Sechste umgearbeitete Auflage. Berlin: J. Springer. 1927. (Sup. roy. 8vo, pp. vii + 935. R.M.87.)

termed commercialized research, and it seems probable that this will become still more common in the future. It seems likely, therefore, that most new synthetic drugs will be covered by patent rights. That this process is going on rapidly is evidenced by the fact that half the references Fränkel makes are to patent specifications. This increasing invasion of therapeutics by patented proprietary remedies is bound to raise special problems in the future. For example, in the past it has been possible for official publications such as the *British Pharmacopoeia* to ignore patented drugs, but it seems doubtful if this will be as easy in the future.

## THE PHARMACOLOGICAL LABORATORIES OF THE PHARMACEUTICAL SOCIETY.

THE laboratories established by the Pharmaceutical Society to fulfil the conditions regarding the control of therapeutic substances the purity and potency of which cannot be adequately tested by chemical means, as laid down by the Therapeutic Substances Act, 1925, were formally opened in June last, but their organization had been in progress since January. The first annual report, which has now been issued, states that the work done has consisted, on the one hand, of the testing of various therapeutic substances sent by manufacturing firms, and, on the other, of research work, which in the main has been directed to the establishment of more accurate conditions for carrying out such testing. The substances the laboratories at first undertook to test were preparations of digitalis, strophanthus, squill, and ergot, and pituitary extract. Of seventeen samples of digitalis received, three were of leaf and fourteen of tincture; three were rejected—one because it was weak, and two because they were too strong. The remaining fourteen conformed to the requirements of the Conference of the League of Nations in September, 1925. That Conference had recommended the use of ouabain as a standard for strophanthus, but it was found necessary to determine a standard applicable to the tincture obtainable in Great Britain; this is that an average tincture should be equivalent to a solution containing 0.35 per cent. of ouabain. The investigation of squill had not at the time of the report yielded a definite result, but the use of scillaren—a crystalline glucoside obtained from squill by Stoll—will probably afford a satisfactory standard. Both these inquiries are being carried on in conjunction with Dr. J. W. Trevan. As the liquid extract of ergot of the *British Pharmacopoeia* does not contain the specific alkaloid of ergot the laboratories were under an obligation to determine the actual therapeutic value of the different physiologically active substances present in the drug. This work was carried out at Queen Charlotte's Hospital in conjunction with Mr. A. W. Bourne, F.R.C.S., and is approaching a successful conclusion. Clark's method of assaying ergot, which for the first time provided a means of determining the percentage of specific alkaloid in the crude drug, has been tested by Miss J. M. Ellis, Ph.C. (Redwood Scholar), who has assayed nine samples of crude ergot from different sources. It was found that there are wide variations in the content of specific alkaloid, and so soon as the pharmacopoeial preparations are altered it will be essential for manufacturers to arrange for the crude drug to be assayed before they buy it. Several investigations are being carried out on pituitary extract; one on the proper dosage in labour, along with Mr. A. W. Bourne, and another into the antidiuretic effect of different samples, undertaken at the request of the Health Committee of the League of Nations; a third on the effect of the extract in certain metabolic conditions has been begun. The original list has been increased and samples of adrenaline, ovarian extract, and parathyroid extract have been tested, and determinations of the toxicity of sodium tetra-iodophenolphthalein have been made. A vitamin-testing department is being formed under the direction of Dr. Katherine Coward, which will shortly be ready to receive samples. The address of the laboratories is 17, Bloomsbury Square, London, W.C.1.

## A STRANGE SICKNESS.

ON July 11th of last year the medical officer of health for Poplar received a message from a local doctor to the effect that several of his patients were stricken with diarrhoea and vomiting. Zymotic diarrhoea being notifiable in Poplar from June to September, further intimations speedily followed from other practitioners in the area till the total number of cases reported rose to over a hundred; most were women and children. The usual duration of illness was twenty-four hours. The temperature ranged between 100° and 104° F. The diarrhoea was constant and severe. Labial herpes frequently ensued. Patients were left collapsed and weak, and three died. The morbid anatomy of the fatal cases showed no striking features. The small intestine was normal, the colon possibly a little congested. The bacteria isolated were of the colon type. The faeces of the living had various aspects, some resembling mild dysentery. In two cases Morgan's bacillus was found. The blood serum, tested for agglutination with the Salmonella and Flexner groups and the Sonne type, was completely negative. Ice-cream was blamed, but, on investigation by Dr. G. C. Hancock of the Ministry of Health, exonerated. No other food could be proved culpable. Gastric influenza and irritant poisoning of chemical origin were considered and set aside. The incidence was confined to a triangular area near Leven Road, and was heaviest on Leven Road itself, where scarcely a house escaped. The water supply, as a vehicle of infection, came under suspicion. A preliminary examination of the water from the local service was made by Dr. Scott of the Ministry, and it was examined later, in detail, by Sir A. C. Houston. Samples drawn from July 20th onwards were, judged by the routine bacterial tests, below the optimum London standard, but not to an extent which under normal conditions would have caused concern. A number of strains which attracted notice were carefully studied, but all were finally pronounced blameless. Several samples, when chemically tested, showed a relatively high chlorine figure. Assuming that the contagion, though present at first, had disappeared before the samples were taken, or else that it was present in the sampled water but, as may occur, eluded discovery, attention was turned to the connexions of the water main serving the stricken area. This pipe was found to be linked up by by-passes with the raw water supply of the adjoining Poplar gasworks, which is derived from the River Lea, and the view was expressed by Mr. J. R. Taylor, an engineering inspector of the Ministry, that under certain conditions of pumping and pressure it would have been possible for reflux raw water from the gasworks to get through the by-passes into the pure supply. The connexion of the two systems was very circuitous, and evidence was wanting that the conditions for reflux were actually operative at any time prior to the outbreak, but a possible channel of contamination appears to have existed, and the incidence of attack on the various streets was precisely such as might have been expected had infection been carried into the main at the suspected points. All communications between the pure and the impure have now been effectively severed. Dr. Hancock's report[1] on this strange sickness describes in a very interesting

[1] Ministry of Health. Reports on Public Health and Medical Subjects, No. 41. H.M. Stationery Office, or through any bookseller. Price 9d. net.

way his exploration of a baffling problem, and is published now, as Sir George Newman indicates in a prefatory note, in order to draw attention to the potential dangers of such water-main connexions.

## GLUCOSONE AND ITS POSSIBLE SIGNIFICANCE IN METABOLISM.

DR. A. HYND recently communicated to the Royal Society a paper[1] on the action of glucosone on normal animals (mice) and its possible significance in metabolism. The work was carried out in the physiological laboratory of the University of St. Andrews, and the observations recorded are of interest to medical men generally. Dr. Hynd found that glucosone or aldofructose, an oxidation product of glucose or fructose, when injected into normal mice subcutaneously, produces in a few minutes a series of symptoms which are very similar to those brought about by an injection of insulin. The condition differs from that produced by insulin in that there is no hypoglycaemia, but it is modified by the use of adrenaline and pituitrin and by the previous injection of aceto-acetic acid. Dr. Hynd ventures the suggestion that glucosone is an intermediate stage in carbohydrate metabolism and that it is normally produced by the action of insulin. According to this view some of the symptoms produced by excess of insulin are really the results of the production of too much glucosone. If Dr. Hynd is right, glucosone may become an important substance in the treatment of those conditions for which insulin is at present prescribed, especially as it can be taken by mouth. Unfortunately the manufacture of pure glucosone is an expensive and complicated matter, and the methods hitherto adopted for production on a large scale by the hydrogen peroxide process result in its adulteration by other oxidation products which are harmful. Thannhauser and Jenke employed such preparations in the treatment of severe cases of diabetes, giving the syrup diluted by mineral waters. They found that it cleared up the glycosuria and the formation of acetone bodies, but could not be continued on account of intestinal complications—diarrhoea. They were probably working with a material which, in addition to glucosone, contained numerous other oxidation products of glucose. The pure glucosone, made by Fischer's process, does not appear to have any deleterious effect beyond that produced by an overdosage. Recovery from a non-lethal dose takes place very quickly and no after-effects are shown. Rats and rabbits have been tried since the paper was written, and these animals also react to glucosone in very much the same way that they do to insulin. The similar oxidation products of maltose and lactose—that is, maltosone and lactosone—are inactive, but when hydrolysed to glucosone give the effects of the latter.

## THE INFLUENZAL CONSTITUTION.

A TRIBUTE was rendered to the prescience of Sydenham by Sir William Hamer at a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on April 29th, when he opened a discussion on the influenzal constitution by remarking that the events of the early nineties had done much to stimulate interest in the ideas for which Sydenham had stood. Sir William Hamer suggested that, epidemiologically, true influenza presented three features: (1) an average wave-length or interval between epidemics of one-third or two-thirds of a year at pandemic times; (2) a somewhat longer wave-length, which, owing to concomitant seasonal influences, tended to be about a year, eighteen months, or two years, for trailers and precursors nearly adjacent to the pandemic; (3) a still longer wave-length, which, when the average time from infection to infection became extended (as it apparently did, even to ten to fourteen days), might be estimated at some five to seven years in the trough between pandemics. He suggested that in the days of Sydenham the epidemiological problem might really have been simpler in that there might have been less development and differentiation of morbid types. He then reviewed the historical facts which illustrated the "setting" of epidemics of influenza, and remarked that modern writers "did not care to face 'brain fevers,' 'soporosités,' 'comatose fevers,' and 'fièvres pétéchiales'; they feared to struggle through the jungle of ship, camp, harvest, and gaol fevers of over two hundred years ago and to penetrate into the primeval forest of 'miliares,' 'fièvres pourprées,' 'fevers infestuous to the brain and nervous stock,' 'trousse-galants,' and 'sweats.' And yet, accepting the principle of continuity, and making allowances for changing terminology, 'settings' of influenza corresponding with those of to-day might be clearly discerned, and the notion emerged, firmly held by the epidemiologists of those times, that these prevalences made up constitutions." Referring to relapsing fever and typhus in relation to influenza, Sir William observed: "There is surely need here for recognizing the correlativity of these (symptom-complex) opposites, and realizing that they are 'inseparable elements of a higher (epidemiological) unity.'" The case might, he thought, be based on three grounds: (1) such individual correlations as the association of dysentery and typhoid in the war period, and also, in 1899-1901, with influenzal constitutions; (2) the oscillations of the curve of London fevers or even of "all causes" after exclusion of the zymotics; (3) the variability of the typhus symptom-complex. The practical lesson drawn was that more attention should be given to the less dramatic and obvious manifestations of influenza. It should be plainly stated that there was a moral obligation upon all who developed influenza to "take it lying down," and to refrain scrupulously, during the early infectious stages, from associating with other people, using public conveyances, and going to places of public assembly. Sir William Hamer believed that if the importance of this was fully realized, far more injury to the public health would be obviated than resulted at the present time from neglect of necessary precautions in all the "dangerous infectious diseases," among which, technically speaking, influenza was, as yet, not included.

## PNEUMOCONIOSIS CAUSED BY ASBESTOS DUST.

DURING the conference of the Royal Microscopical Society at Liverpool, at the end of March, a case of pneumoconiosis due to asbestos dust was reported by Dr. W. E. Cooke and Mr. C. F. Hill. Although the asbestos industry is more than 2,000 years old, this case appears to be only the second reported, the first patient having died in the Charing Cross Hospital in 1900. In the present case the particles found in the lungs were large, some measuring as much as 350 microns in length; they were shown to represent the brittle iron-containing part of the asbestos fibres. Chemical analysis of the substance in the various stages of its manufacture, and of the dust, were correlated with the microscopical appearance. The dust contained 18 per cent. of iron as ferrous oxide, the raw material 2.1 per cent., and the finished article 0.1 per cent. The microscopical appearances of the dust were identical with those of the particles found in the lungs. A second interesting feature which aroused a good deal of discussion was the presence of a body which some thought was an aspergillus. The authors of the paper held the view that it was a hyphomycete analogous to that found by

[1] *Proceedings* of the Royal Society, B, vol. 101.

Dr. H. H. Scott in batrachians, or that it belonged to the tuberculariaceae, a family of hyphomycetes described by Ehrenberg in 1818. In the course of the conference Dr. Eric Ponder described the procedure whereby he had investigated the diameter of the red cells of man before and after exercise. The corpuscles immersed in plasma were examined and photographed in a special chamber containing a gas mixture in equilibrium with the blood at rest or after exercise. It was stated that no difference in the mean diameter of the cells appeared to be caused by even severe exercise.

## THE PRODUCTION AND CONSUMPTION OF DANGEROUS DRUGS.

THE Advisory Committee of the League of Nations, which deals with the traffic in opium and other dangerous drugs, has recently issued a summary of annual reports for the years 1924 and 1925 received from various countries and mandated territories. In the case of Germany it appears that 152,000 kilograms of opium were imported in 1925 and some 14,000 kilograms of morphine were manufactured, of which 4,642 kilograms were exported. In Great Britain, in the same year, 68,541 kilograms (150,806 lb.) of raw opium were imported, and the novel feature recorded is that no less than 52,722 kilograms (116,000 lb.) of the total import came from India. Persian opium has almost ceased to be imported, and Turkish opium is falling off. Although Indian opium only contains 9.07 per cent. of morphine as against 11.03 per cent. in the Turkish drug, it is nevertheless found to be commercially a profitable source of the alkaloid. British exports of morphine in 1925 amounted to 95,295 ounces (2,706 kilograms), showing a considerable increase on the previous year. It is reported from Hong-Kong that 11 per cent. of the total revenue of the colony is derived from opium, that 41,600 lb. of raw opium and 28,000 lb. of opium "prepared" for smoking were imported, during 1925, from India. In Iraq the sale of opium has become a Government monopoly. In the case of the United States 100,478 lb. (45,667 kilograms) of raw opium were imported in 1925 from Turkey, Greece, and England; 105,689 ounces (3,001 kilograms) of morphine were manufactured, nearly all of which was used for home consumption. It is stated that no heroin was produced during the year, as its manufacture is now forbidden by the Federal Narcotics Control Board, but 154 kilograms of the alkaloid were sold in 1925. In 1924 the area under cultivation for the opium poppy in India was 54,708 hectares. The consumption of opium "prepared" for smoking in the years 1920-24 appears from the statistics to be enormous in Burma, Formosa, French Indo-China, Hong-Kong, Malaya, the Netherlands Indies, and Siam. It is clear that much remains to be done before the restriction of opium and other dangerous drugs to medical and legitimate purposes is achieved.

## TEACHING OF INDUSTRIAL MEDICINE.

SIR THOMAS LEGGE gave a Chadwick public lecture on the teaching of industrial medicine in the rooms of the Medical Society of London on May 3rd. He said that he considered that Charles Turner Thackrah, a medical practitioner of Leeds, Edwin Chadwick, and Dr. Southwood Smith laid the foundation of industrial medicine in this country a century ago. Unfortunately the work of the certifying factory surgeons—the outcome of their labours—became stereotyped on a too narrow negative basis by the Factory Act of 1844 and has so remained ever since. While the medical student cannot fail to learn a great deal about the maladies and accidents which strike down workpeople, little or nothing is done in the medical curriculum to link this knowledge up with their causes in the modern factory system. A right attitude of mind towards labour in the newly qualified medical man is an all-important factor in his equipment, but how many of them know that unless the employer has done everything (and everything means a good deal) the workman can do next to nothing to protect himself against the risks of his trade. The medical man should not have to embark on practice without even knowing the names of the eleven occupational diseases he is under a statutory obligation to notify. Over twenty others are scheduled under the Workmen's Compensation Act, the benefits of which are not easy to realize, unless the medical man looks upon it as his duty to his patient to tell him how to obtain them. But no one teaches this to the medical student. The newly qualified medical man is much more likely to be called on to give evidence at some inquest, the result of poisonous dust, gases, or fumes, than in a murder case, and forensic medicine teaching might stress the dramatic human interest in "gassing" cases and mine rescue work. The sheet anchor for the protection of workers against poisonous dusts and fumes is exhaust ventilation, applied as near as possible to the point of origin, and that against vitiated air from the aggregation of persons general mechanical ventilation by extraction fans. Sir Thomas Legge expressed his opinion that what was wanted most in the factory was preventive medicine on the clinical side—that is, by a practising doctor and not by an administrative medical officer.

## ROYAL SOCIETY CONVERSAZIONE.

THE usual spring conversazione of the Royal Society was held on May 11th, in the Society's rooms at Burlington House, when the guests were received by the president, Sir Ernest Rutherford, O.M. The important advances now being made in microscopy were illustrated by Mr. J. E. Barnard, F.R.S., who showed two complete microscopical outfits for use with ultra-violet light, from the department of applied optics of the National Institute for Medical Research. One of these microscopes was the experimental one which was made and has been in use for some time in the department; the other was a finished model recently constructed by Messrs. R. and J. Beck. This form of microscope can be used either for transmitted light or for the investigation of filterable viruses by the dark-ground illumination method. Not only is increased "resolution" of the organisms obtained by the short wavelength used, but enhanced visibility is secured by this method of illumination. Magnification is now possible to 3,500 times, and accurate focusing and microphotography are possible at such small intervals as one-tenth of a micron. Spectrograms of the absorption by certain culture media of ultra-violet light were shown, and the efficiency of the apparatus was demonstrated by slides of the fine granules in silver films and of the organism of bovine pleuropneumonia. Dr. Thomas Lumsden showed a series of microscopical slides illustrating the effect of cytotoxic serums on cancer cells. He demonstrated that anti-human-cancer serum applied to cultures of mouse cancer, mouse heart, and mouse kidney killed the cancer cells within a few minutes; the normal tissues were undamaged and their staining reactions were not affected. It was also shown that mouse cancer cells grown in a rat could be cultured *in vitro* for two or three weeks in the serum of the rat host, but that this serum killed cultures of mouse cancer cells from a mouse; thus, the temporary sojourn in the rat had protected the mouse cancer cells introduced into it. Rat sarcoma cells could grow freely in the serum of a rat rendered immune to this tumour; the peritoneal exudate destroyed the cells but was harmless to normal rat tissues and to other tumour cells. The Natural History Museum showed skins of the African squirrel to illustrate how in rain forests the colour was nearly black;

in less dense woods, redder and brighter; on grass lands, greyer; and on the fringe of deserts, more yellow. It also exhibited balls made of disintegrated leaf fibres by the action of waves, and a hair-ball from the stomach of a horse. Mr. A. K. King demonstrated the application of ultra-violet radiation to the detection of impurities in distilled water, and the estimation of minute quantities of arsenic. The Astronomer Royal showed transparencies illustrating the sun's corona at four previous eclipses, and the National Physical Laboratory supplied a model of the shadow of the moon near the earth's surface, on the scale of ten miles to the inch, showing its dimensions, direction in space, and intersection with the earth's surface. Mr. G. H. Gabb showed the recently discovered astrological planisphere constructed for Queen Elizabeth about 1560-70, by Dr. John Dee, and engraved at the Royal Mint in the Tower by Humphrey Cole, who placed in its centre the arms of Elizabeth and her monogram, surrounded, in concentric circles, by the twelve astrological houses and months, with the zodiacal signs. During the Commonwealth this planisphere came into the hands of Henry Sutton, who in 1655 used the blank space on the reverse for the construction of a circular slide rule—the earliest dated "spiral" slide rule known. During the evening cinematograph films and lantern slides were shown by Mr. F. Martin Duncan, and Mr. D. Seth-Smith, by permission of the Zoological Society of London, to illustrate the courtship of birds. Sir Almroth Wright gave a demonstration of the phenomena of "intertraction."

## DICTIONARY OF NATIONAL BIOGRAPHY.

A NEW volume of the *Dictionary of National Biography* is to be published this year. Few men have raised a better memorial to themselves, doing at the same time honour to the calling they follow, than George Smith, head of the firm of Smith, Elder and Co., when, in 1882, he began the publication of the *Dictionary of National Biography*; it appeared in sixty-three quarterly volumes between 1885 and 1900. George Smith was fortunate in securing the services as editor of Sir Leslie Stephen, under whose guidance the first twenty-one volumes were published. The next six were edited by him and Sir Sidney Lee, and the remaining volumes by the latter alone. As the plan was to make the original issue cover the names of all British notabilities down to the end of the nineteenth century, it followed that the names of a certain number of persons who died during that century could not be included in their proper alphabetical order; for these a supplement, also edited by Sir Sidney Lee, was published (1901-2), forming volumes lxiv to lxvi, and in it was included the biography of Queen Victoria, who died on January 22nd, 1901. In 1908 and 1909 the sixty-six volumes were reissued, with some corrections, on thinner paper in twenty-two volumes. Later on the publication was transferred to the Oxford University Press, by which it is now issued. A new series was begun with the issue of the second supplement covering the years 1901-1911, and the Press hopes to publish in the course of this year another new volume covering the years 1912-1921. It is edited by the Regius Professor of Modern History at Oxford (H. W. C. Davies) and by Mr. J. R. H. Weaver, of Trinity College, Oxford. It is intended to publish a new volume every ten years; that now nearly ready for publication has 269 contributors, nine of them women, and the names of nearly all those included in it are familiar to everyone acquainted with the events of this century. Among the medical names are those of Lord Lister (Sir John Rose Bradford), Sir William Osler (Sir Archibald Garrod), Mrs. Elizabeth Garrett Anderson (Miss F. C. Johnson), and Sir Leander Starr Jameson (Mr. D. O. Malcolm). An alphabetical index to the whole of the century so far (that is, 1901-1921) will be appended.

## THE WOOLWICH MEMORIAL HOSPITAL.

THE next few weeks will see the completion of a notable addition to the hospitals of London, for the first section of the new hospital erected by the trustees of the Woolwich War Memorial Fund is almost finished and should be ready to receive patients in a month or so. Those who have travelled the Dover Road during the last few months cannot fail to have noticed the handsome building crowning the summit of Shooter's Hill, and the hospital authorities are to be congratulated upon their prescience and enterprise in securing such an attractive and unusual site; one, moreover, which amply provides for all conceivable extensions of the hospital, for it consists of no less than 13 acres of freehold land. Among the hills of London and its environs Shooter's Hill has always held high rank, first for the quality of its air and the quantity of its sunshine, and secondly for the remarkable panorama visible from its summit on a clear day. The highest point of the hill, which is actually in the hospital grounds, is 422 feet above sea-level, and to look round from there, or better still from the roof of one of the ward blocks, is an arresting experience. To the north, spreading up to the foot of the hill, are the densely populated districts of Woolwich and Plumstead—all churches, chimneys, trams, and houses; then the winding reaches of the Thames, with all its busy shipping, and, in the distance, the hills of Essex. To the south Eltham, Mottingham, Sidcup, and Chislehurst look little more than villages from that height—and even they are lost in the wide expanse of mile upon mile of smiling Kentish countryside, with its trees and fields and orchards stretching away to the far distant southern Downs.

An exceptional site demands an exceptional building, and the architects, Messrs. Pite and Fairweather, have taken full advantage of an unusual opportunity, for they have produced a gracious, dignified group of buildings planned with real distinction. Following the contours of the sloping ground the main corridor of the hospital curves east and west along the brow of the hill, and in the slight concavity so formed on the northern side are the administrative block, the operating theatre block, power house, etc. The convex side is left free for the ward blocks, which project at right angles from the main corridor, and so are directed south towards Kent and the sun. A feature of the ward blocks is the provision of commodious sun balconies, so arranged as to allow of patients remaining out no matter what the weather.

The ultimate aim that the Memorial Fund Committee has in view is a fully equipped general hospital of 320 beds. £180,000 has already been collected—practically enough to cover the total cost of the first section of the hospital, consisting of administrative block, residents' quarters, operating theatre block, power house, pathological block, x-ray department, maternity unit, and two ward units, each consisting of two wards of 26 beds each, with further accommodation for 6 beds on the balcony of each ward. The next section to be built will consist of two further ward blocks, a paying patients' pavilion, and the nurses' home, the nurses meanwhile being housed in the main building. Everything has been designed in such a way that future additions will entail no interference with the existing units. They will merely be attached at points already carefully planned, and all essential services, such as drainage, electricity, steam, and water supply, are provided for on the basis of what the demand will finally be when the whole scheme is completed.

The Woolwich Memorial Hospital is a metropolitan hospital in the country, or nearly in the country—certainly one of the best bits of country to be found within twenty-five minutes' drive of Charing Cross; and it will be very interesting to watch the development of what is the first experiment of its kind—a general hospital built, staffed, and equipped on the same lines as any other important London hospital, with a large industrial population almost at its doors, but so situated that problems of light, air and sunshine, and adequate space for development can arouse no apprehension. Lord Dawson and Sir Berkeley Moynihan have consented to act as consultants, and this sets a high standard for the remainder of the honorary staff who are about to be appointed.

# Union of South Africa.

[FROM OUR CORRESPONDENT IN PRETORIA.]

## ANNUAL REPORT ON PUBLIC HEALTH.

BY Act of Parliament there was established in 1919 a Department of Public Health under the control of a Minister. An abridged report of the work and activities of this department is prepared annually by the Secretary for Public Health (Dr. J. Alexander Mitchell), and appears along with similar reports by the secretaries of the other Government departments in the volume of Annual Departmental Reports. The volume is published during the Parliamentary session and presented to both Houses of Parliament.

### *Public Health Organization of the Union.*

Under the Public Health Act of 1919 there was established a Council of Public Health to advise the Minister and Department—the Minister being chairman and the chief health officer for the Union deputy chairman. Of the remaining seven members (none of whom may be officers in the public service) four are medical practitioners. These seven members hold office for three years. The second three-year period ended on June 30th, 1925. The members newly appointed from that date were Miss Mabel Elliott; Messrs. J. H. Nicolson and M. C. Vos; Drs. Charles Porter (one-time medical officer of health for Johannesburg), S. M. de Kock, E. Hill, and W. Watkins-Pitchford. Miss Elliott has since resigned, and has been succeeded by Mrs. Broers. Dr. Watkins-Pitchford was succeeded on his retirement from the South African Institute for Medical Research by Sir Spencer Lister, the director.

The departmental staff consists of the Secretary for Public Health, who is also chief health officer for the Union, and six assistant health officers. Of the latter, four have their headquarters in Pretoria, the administrative capital of the Union, one is stationed at Capetown, and one at Durban, Natal. In addition there are pathologists, port health officers, and inspectors.

District surgeons are appointed for Government medical work, in connexion with accidents, assaults, and other medico-legal cases, paupers, and medical attendance on police and gaol officials. Under the present law the Government is not responsible for providing medical facilities for the general public; but district surgeons' appointments are always made so as to fit in as far as reasonably possible with the interests of the public, provided no extra cost is entailed. Last year there were 282 district surgeons; of these, seven are whole-time officers—namely, two each at Pretoria and Durban, and one each at Capetown, Port Elizabeth, and East London. Four are whole-time officers appointed jointly with local authorities or public bodies—namely, at Kimberley, Grahamstown, Queenstown, and Wynberg. The remaining 271 render part-time service to the Government, being usually general practitioners in country districts.

An urban local authority may, with assistance from the Government, appoint a medical officer of health. Of the 392 urban local authorities, the following employ whole-time medical officers of health—namely, Johannesburg, Capetown, Pretoria, Durban, Pietermaritzburg, East London, and Port Elizabeth; four have medical officers of health holding other public appointments, but doing no private practice. Of the remainder, many pay local private practitioners small retaining fees to perform such local public health duties as may arise. Fifty-two of the urban local authorities employ certificated sanitary inspectors devoting the whole of their time to sanitary work.

### *Plague.*

Epidemiologically the year under review (1925-26) was uneventful, the only noteworthy feature being the extensive spread of plague infection amongst the veld rodents of the north-western Cape districts. This enzoötic plague is confined entirely to inland districts. Fortunately, the gerbille carrier is very shy of man, is nocturnal in its habits, and has only very rarely been found in railway trucks. The risk of conveyance of plague infection to the ports from the inland areas where infection is enzoötic is, therefore, very slight. The risk of introduction of plague from outside the Union is, however, great. No actual or suspected plague in man or rodents occurred in the Union ports during the year. The greatest vigilance is maintained, systematic bacteriological examinations of rodents are carried out, and continued efforts are made to keep down the rodent population of the ports. An improved rat-guard has been devised by the department for mooring cables. Tests proved this guard to be more effective in preventing migration of rats either to or from vessels than any hitherto employed, and its use has been made compulsory, by regulation, in respect of vessels recently arrived from plague-infected or suspected ports. Shipping companies and all concerned have been furnished with drawings and specifications, and arrangements were made by the department with certain firms for the manufacture and supply of these guards.

The number of cases of human plague during the year under review was small compared with previous years. There were in all only 71 cases, of which 46 proved fatal, 86 per cent. of the cases were of the bubonic type, 10 per cent. pneumonic, and 4 per cent. mixed pneumonic and bubonic. Synchronizing with an extensive epizoötic among gerbilles, multimammate mice and hares, an extensive and scattered epidemic occurred at the beginning of 1926 on fourteen different farms in the Orange Free State; 37 cases, including 8 of Europeans, were notified, with 26 deaths. The history of one European family, in which 5 cases occurred, is very typical. At their farm many dead gerbilles were found, and several natives contracted plague. A little later the owner of the farm became infected. He was attended during his ten-day illness by his brother and sister, and visited by many friends. On his death these people were notified by the district surgeon that they were under quarantine, and were not to leave the farm. Two days later the brother contracted pneumonic plague. His mother and two sisters became infected through nursing and kissing him, and all died within a week.

Another outbreak occurred in the eastern Cape Province, resulting in 12 cases with 9 deaths; 4 of these were among Europeans belonging to the same family. The son of the farmer was an enthusiastic hunter of hares and other small animals. Dead hares and field-mice had been observed on the veld shortly before he sickened. He remarked one day on the number of fleas that he had brought in with him from the veld. Soon after he developed a bubo below the shoulder-blade and died on the sixth day. Before his death he was kissed by his father and mother; both were down a few days later with pneumonic plague, and were dead within a week. Two days after the death of the mother the daughter developed pneumonic plague and died six days later.

The report gives an account of the flea, rodent, and plague research which has been carried on. This work has been previously described in the BRITISH MEDICAL JOURNAL (June 5th, 1926, p. 962, and August 7th, p. 269), including the discovery of the very interesting "Tiger River disease." The causative bacillus appears capable only of attacking small veld rodents, and it has not been found possible to infect hares, ground squirrels, rabbits, suricates, domestic rats, guinea-pigs, mongooses, cats, dogs, or monkeys with this disease.

### *Leprosy.*

It had been intended three years ago to make a systematic leprosy survey of the Union, with a view to ascertaining the position as accurately as possible. Shortage of staff and financial circumstances have rendered this impossible, but during 1924 all magistrates and district surgeons were circularized and requested to inquire into the matter. From information so obtained fairly detailed tables have been prepared. During the fifteen-year period ended June, 1924, the number of lepers discovered and certified in the Union was 5,162. It is estimated that at least 1,630 lepers remained at large, unknown and uncertified, at the end of that period, bringing the total to 6,792. The estimate of uncertified cases was probably on the low side, owing to the magistrates not taking sufficient account of cases in the early stages and still without disfigurement or obvious symptoms. The average number of new cases discovered annually was approximately 450. The

average period elapsing between onset of the disease and segregation was about six and a half years. Efforts have been made to reduce this period, but it is still at least five years. Assuming that, as is probable, the annual number of new cases developing remains at about 450, then this figure multiplied by 5 gives an idea of the number of cases in various stages at present at large and undiscovered. Assuming, then, that there are about 2,000 undiscovered cases, the general position of the Union in 1924 is as follows:

| | |
|---|---|
| Certified lepers in the six institutions ... ... | 2,141 |
| Certified lepers, home-segregated ... ... ... | 24 |
| Certified lepers awaiting removal ... ... ... | 100 |
| Probationally discharged lepers ... ... ... | 905 |
| Uncertified lepers ... ... ... ... ... | 2,000 |
| Total number of lepers in the Union ... | 5,170 |
| Leprosy rate per 100,000 of population ... | 70 |

The detailed tables reveal many points of interest. The anaesthetic type predominates amongst native cases, the nodular and mixed types amongst Europeans and Eurafricans. In a large proportion of cases a history of direct association with previous cases was elicited. The average age on first admission is 33. In a large percentage of cases the skin symptoms were those first noticed. The proportion of lepers giving a history of association with previous cases in the same family is certainly much understated in the tables, as leper patients are notoriously apt to conceal facts of this kind. Further examination of associated cases and family groups is being carried on, and a number of family trees are being prepared. This should throw useful light on the modes of spread and conditions favouring spread. So far the results support the views of Sir Leonard Rogers and his co-workers—that in the great majority of cases infection takes place in childhood or early adult life, and that the association of infective lepers with children and young people is much more dangerous than their association with older persons. The early years of the disease are as a rule the most infective, and during the long period—usually about six years—the cases of infective type have been associating freely with their families and others, and spreading the infection. It is evident that until some system or method is devised by which early discovery can be secured and precautions instituted, the spread of the disease cannot be effectively limited. Compulsion will never effect this; the voluntary co-operation of the native peoples must be secured.

Since the introduction, some years ago, of the Leprosy Board system only active and actually or presumably infective cases are segregated in institutions; the accommodation in the six institutions is now ample, and the annual expenditure on leprosy has been considerably reduced. With few exceptions all the patients in these institutions are now receiving active antileprotic treatment by various modern methods.

*Malaria.*

Except for serious localized prevalence in Zululand and the Northern Transvaal, there was but little prevalence of malaria in the endemic areas. Natives recruited from endemic areas in Zululand appeared to be relatively immune, and are at an advantage compared with other natives when employed in railway construction in malarious areas.

A long-overdue anopheline survey of the Union is in contemplation. Little progress in this direction has been made since 1905, when *A. costalis* was proved to be the main vector of a serious epidemic in Natal. The proposed survey is to be undertaken jointly by the Division of Veterinary Research and the South African Institute for Medical Research, with the co-operation of the Department of Public Health. Some work was done by the institute and the department during the year. Six species of anophelines were identified as occurring in the Hartebeestpoort irrigable area, near Pretoria.

*Typhus Fever.*

Of the 1,135 cases of typhus fever that occurred in the Union during the year under review 55 were among Europeans, with one death, and 1,080 among non-Europeans, with 145 deaths. The disease was comparatively quiescent, though unreported outbreaks probably occurred in some of the Transkeian districts. Sporadic cases were detected in Durban by the routine application of the Weil-Felix test to all specimens of blood received in the laboratory; these early diagnoses were often subsequently confirmed clinically. The symptoms of the form of the disease usually met with in South Africa are often obscure and indefinite, and its diagnosis is frequently difficult, so that unless special care is taken and a sharp look-out kept, cases are very liable to go unrecognized and unreported.

# England and Wales.

RUTHERFORD MORISON TESTIMONIAL FUND.

THE Rutherford Morison Testimonial Fund has now been closed and the accounts presented by the honorary treasurer, Mr. R. J. Willan, M.S., F.R.C.S., have been duly audited. The total amount received in subscriptions was £1,523 9s. 6d. The cost of the portrait, including the fee to the artist (Mr. Harold Knight) and the price of 100 photogravures with incidental expenses, including printing and stationery, amounted to £458. This left a sum of £1,206, which was handed over to Mr. Rutherford Morison and paid by him to the Council of the University of Durham College of Medicine, who will administer the travelling surgical scholarship which was the purpose to which Professor Morison desired the fund to be devoted. The scholarship will be available for candidates proposing to take the degree of Doctor of Surgery (D.Ch.) in the University of Durham, and it is intended that the holder should undertake at least six months' surgical study abroad. The income of the trust will be allowed to accumulate for three years, and the first award will be made in 1929. The scholar will be nominated by a committee consisting of the professors of surgery, anatomy, physiology, and pathology and bacteriology, together with one member of the honorary medical and surgical staff of the Royal Victoria Infirmary. We may congratulate Mr. Rutherford Morison on this very striking tribute to the esteem in which he is held and to the great respect which he has inspired as a surgeon, teacher, and a man. We may also congratulate him on the purpose to which he devoted the fund; everyone will agree that a period of observation abroad is of the greatest advantage to a young surgeon; it is, in fact, becoming more and more necessary. The habit once acquired is not likely to be lost, and there are already in existence several societies of surgeons the main object of which is to afford opportunities for visiting surgical centres at home and abroad.

RHEUMATIC HEART DISEASE IN CHILDREN.

The London County Council, on May 10th, had before it a report by the Public Health Committee on the need for beds for chronic cases of rheumatic heart disease in children. The report followed upon a reference of this subject to the committee, moved in the Council some weeks ago by Dr. Stella Churchill. The report repeats the statements and figures which were given recently in a report of the Metropolitan Asylums Board (BRITISH MEDICAL JOURNAL, April 23rd, p. 776), and relates the circumstances which led up to the proposed extension of Queen Mary's Hospital at Carshalton, where 350 beds will presently be available for these cases. The committee states that this additional accommodation will very materially assist the solution of the problem of the convalescent treatment of the rheumatic child, and when the permanent addition to St. Mary's Hospital is completed there should be no question of the adequacy of the provision made. The Public Health Committee has expressed to the Metropolitan Asylums Board its appreciation of the steps it has taken.

HOSPITAL EXTENSIONS IN NOTTINGHAM.

Princess Mary visited Nottingham on April 30th, and opened the Rope Walk wing of the Nottingham General Hospital and the new buildings of the Children's Hospital. The Rope Walk wing contains a waiting-hall for 500 out-patients, with consulting rooms opening into it, and a dispensary on the same floor. There are also *x*-ray,

orthopaedic, and electro-therapeutic departments. The first floor is devoted to diseases of the ear, nose, and throat, and additional beds for forty patients have been made available. The Rope Walk wing has taken some three years to erect and equip; the cost was £100,000, half of which was presented by Mr. W. G. Player, J.P. Many of those who were present at the Annual Meeting of the British Medical Association last year were able to examine the buildings, then approaching completion, and to appreciate for themselves the great value of this addition to an enterprising hospital. The new premises of the Children's Hospital will accommodate eighty patients, but the work of extension will not be completed for some time yet. The new building consists of a basement and three floors; ample provision has been made for open-air treatment, and the windows of the wards contain glass permeable to ultra-violet rays. It is proposed to extend and bring up to date the present out-patients' department and to provide a separate building for massage and treatment by ultra-violet rays.

### Outbreak of Small-pox at Hendon.

The recent occurrence of nine cases of small-pox at Hendon is noteworthy in view of the severity of the infection. From information supplied by Dr. T. S. McIntosh, medical officer of health for Hendon, it would appear that the first patient was a man, aged 47, who had been vaccinated in infancy. Although his illness did not take a grave form, it was not of the mild type prevailing elsewhere in England; the source of the infection has not been traced. His wife, aged 42, who had not been vaccinated since infancy, contracted the disease severely, but is believed to be convalescent. Two daughters aged, respectively, 16 and 8, became infected; both were unvaccinated and the infection ran a severe course. The elder died, the disease being of the confluent fatal type, but it is hoped that the younger may recover. Four workers in the laundry to which the linen from this family had been sent developed small-pox, and three died. Two of these, aged 38 and 15, were unvaccinated, and the disease was of the confluent fatal type. The third was a rapidly fatal case of haemorrhagic small-pox in a woman, aged 23, who had only been vaccinated in infancy. She gave birth to a premature live child on the morning of the day on which the diagnosis was made. The infant developed small-pox papules a week after birth, coincident with the appearance of vaccination vesicles, and died five days later. The fourth worker in the laundry was an unvaccinated woman, aged 21. She was vaccinated after the onset of the first symptoms and vesicles appeared about the same time as the small-pox eruption. The case is of moderate severity and the patient is expected to recover.

## Scotland.

### Extension of Radiological Facilities at Edinburgh Royal Infirmary.

Some six months ago a very elaborate electrical department was opened at the Royal Infirmary of Edinburgh; in addition to the most modern radiological apparatus, it has departments for medical electricity, massage, and exercise-therapy. It has been suggested that the benefits of this department might be available for persons other than the patients in the institution or those attending the various out-patient departments. Such facilities are not available for the public in Edinburgh and the area of which it is the medical centre. It has therefore been decided to receive patients who are under the care of outside practitioners in this department of the hospital. To some it seems as though this were the first step towards making the benefits of the Infirmary generally available to all classes of the community, or, in other words, the establishment of a section for paying patients; this, many persons regard as highly desirable. The conditions under which these benefits are now available are as follows:

The managers of the Royal Infirmary have decided to extend facilities to medical practitioners for the examination or treatment by the radiologist of patients who are unable to pay the usual private fees; and to others for treatment by apparatus and appliances not otherwise available in the city or district. Requisition forms can be obtained at the superintendent's office. These must be completed and forwarded, together with a short history of the case, to the superintendent, who will make an appointment for the attendance of the patient and forward details of any necessary preparation. It is expected that the patient will give an appropriate donation to the hospital in order to help to defray the necessary expense incurred. The amount of such donation will be adjusted by the superintendent after consultation with the private medical attendant.

### The Astley-Ainslie Institution, Edinburgh.

The Astley-Ainslie Institution was founded through a bequest by the late Mr. David Ainslie of Costerton, "for the relief and behoof of the convalescents in the Royal Infirmary." It is under the control of a board of governors, nominated by various public bodies in Edinburgh, whose policy is to deal with patients whose convalescence is likely to be prolonged, but who may be expected eventually to regain health and to resume their ordinary avocations. An important aspect of the work of the institution is the scientific investigation of the process of "convalescence," on lines similar to those followed in the study of the inception and progress of disease. The governors have secured a site of over thirty acres, on the southern slope of the hill in the Grange district, with an exposure to the south, well wooded, and with an uninterrupted view of the Pentland and Braid Hills. It is interesting at the moment to recall that the property includes the house and policies of Millbank, the residence of James Syme, and the home from which Lord Lister took his wife. A unit, for female patients, has been in use since 1923. The remainder of the institution is under construction. The wards are built on the "butterfly pavilion" system, first, we believe, introduced by Sir Robert Philip in the Tuberculosis Sanatorium, for the designing of which he was responsible. Each pavilion has wide balconies, and the new scheme includes an administrative block, a nurses' home, central kitchen, power station, and a scientific block containing the radiological and electrical department, a gymnasium for treatment by physical exercises, a dental department, a research laboratory, and other accessories. Sun baths and shelters for open-air treatment are erected in the grounds. When completed the institution will accommodate about 150 patients. The cost of maintenance is borne entirely by the funds bequeathed by Mr. Ainslie.

### Slum Clearance in Scotland.

At a conference of representatives of local authorities in Scotland, held in Glasgow last week, the slum clearance problem and town-planning in Scotland were discussed. A paper was read by Mr. John Bryce, director of housing for Glasgow, in which he reviewed the various slum clearance activities in Glasgow since 1923, which had involved an expenditure of more than £1,000,000. He said that the situation bristled with difficulties, being mixed up with complications in regard to wages, cost of land, insanitary conditions, drink, dirt, disease, crime, greed, maladministration, and the necessity for effective control. In every scheme for rehousing dispossessed tenants a caretaker was on duty who took an interest in the moral and physical welfare of the tenants, and saw that they kept their houses in order and obeyed the rules and regulations. Usually these caretakers had to educate the tenants to a higher standard of living, and they reported periodically to the manager of the City Improvement Department. Dr. William Robertson, M.O.H. for Edinburgh, dealt with the subject from the public health point of view. The vital statistics, he said, were always influenced by the slums, for people who grew up in slums were bad resisters of disease. The sanitarian of fifty years hence would reap the benefits that would accrue from the efforts now being directed against slums. Dr. Macgregor, M.O.H. for Glasgow, in the course of the discussion, remarked that the clearance of slums resulted in several benefits, including reduction in the proportion of one-apartment houses, the demolition of frankly insanitary houses, and the removal of a certain amount of overcrowding, for somewhere about 10 per cent. of the slum houses which had

been demolished in Glasgow had contained two families. Mr. G. D. MacNiven, F.R.I.B.A., of the Scottish Board of Health, Edinburgh, dealt with the present position of town-planning in Scotland, which he said was far from satisfactory. The first town-planning Act had been passed in 1909, but so far only two schemes had been approved by the Scottish Board of Health. The war, to a certain extent, necessitated the postponement of work in this direction, and since 1919 pressure of work in connexion with urgent housing questions had monopolized attention. He suggested that co-operation and joint action by several local authorities lay at the root of town-planning, and that regional planning was a better title. A conference of local authorities in the Clyde Valley was to be held in Glasgow on May 20th, under the chairmanship of Dr. W. E. Elliot, Under-Secretary of State for Scotland, and it was hoped that the whole subject as it affected that area would then be dealt with.

### Glasgow Ear, Nose and Throat Hospital.

At the annual meeting of the Glasgow Ear, Nose and Throat Hospital, held on April 27th, Lord Provost Mason presided. The hospital has recently moved into new quarters in St. Vincent Street and attendances have greatly increased. The numbers for the ten months ending December 31st, 1926, were 25,430, which was 2,129 more than the total for the whole preceding twelve months, and 8,593 patients had been treated as compared with 7,202 in the previous year. Indoor patients for the ten months numbered 928, as compared with 480 in the previous year. The income for the ten months had exceeded the expenditure by £649. Lord Provost Mason remarked that the hospital was now one of the most up-to-date and highly equipped institutions of its kind in the country, and quoted Mr. Neville Chamberlain as saying that this was a perfect example of what a hospital should be. £60,000 had been raised in order to erect and equip it, and it had started its career free from capital debt.

## Ireland.

### Medical Register for the Irish Free State.

The Medical Practitioners Bill (1927) was read a second time in the Dail on May 5th. The bill gives effect to an agreement which was signed by Lord Balfour on behalf of the British Government, by Sir Dawson Bates on behalf of the Government of Northern Ireland, and by Mr. McGilligan on behalf of the Free State Government. This agreement forms a schedule to the bill. The agreement provides, among other matters:

1. That the nomination of a member of the General Medical Council, formerly made for Ireland by His Majesty, with the advice of the Privy Council, shall henceforth be made by His Majesty in Council on the recommendation of the Governor of Northern Ireland.

2. The nominations of members of the General Medical Council by universities and medical corporations in Ireland and the election of a member of the General Medical Council by registered medical practitioners in Ireland shall henceforth be made and had in the same manner as they formerly were.

3. Subject to the provisions of the agreement, the constitution of the General Medical Council and of the several branch councils as formerly existing under the Medical Acts, and the powers of holding qualifying examinations and granting diplomas for the purpose of registration in the General Register, formerly vested in certain universities and medical corporations in Ireland, shall be deemed not to have been affected by the establishment of the Irish Free State or of Northern Ireland, and for the purpose of the preparation and keeping of the general *Medical Register* the General Medical Council and the Branch Council for Ireland, and their respective officers, shall have, and may exercise in relation to persons, universities, medical corporations, and matters in the Irish Free State or in Northern Ireland, all such powers, jurisdictions, and authorities under the Medical Acts as the said councils respectively, and their respective officers, formerly had, and might exercise, under the Medical Acts for that purpose in Ireland.

Any person who is or shall be registered in the general register shall be entitled on payment of a fee prescribed by the Free State Parliament, to be registered in the *Irish Free State Medical Register*, provided that no fee shall be payable by any person who, on the date of the establishment of the *Free State Register*, is registered in the general *Medical Register*, and applies for registration in the *Free State Register* in such time and manner as may be prescribed by the Oireachtas. No person whose name has been erased from the *Free State Register* on account of his conviction of a felony, misdemeanour, etc., or his having been judged by the Free State Medical Council to have been guilty of infamous conduct in a professional respect, shall be entitled to be subsequently registered in the *Free State Register* by reason of his being registered in the general *Medical Register*. A person not previously registered in the *Free State Register* shall not be entitled to be registered therein if his name has been erased from the general *Medical Register* for a felony, misdemeanour, etc., or infamous conduct. With a view to preventing the holding of simultaneous inquiries the General Medical Council shall report to the Free State Medical Council every case in which it proposes, in connexion with the exercise of its disciplinary powers, to hold an inquiry into the conduct, in Great Britain or in Northern Ireland, of any person registered in the *Free State Register*, and the Free State Council will similarly report to the General Medical Council every case in which it proposes to hold an inquiry into the conduct in the Free State of any persons registered in the general *Medical Register*. On the receipt by either of such a report it (Council) shall have regard to the desirability of postponing its inquiry into the matter pending the completion of the inquiry by the other body. In the same way erasures from either *Register* shall be notified by one Council to the other.

The Medical Registration Council proposed to be established for the Free State will consist of nine members: (*a*) one nominated by the Executive Council of the Free State Government, (*b*) one nominated by each of the following bodies —that is to say, University College (Dublin), University College (Cork), University College (Galway), the University of Dublin, and the Apothecaries' Hall of Ireland, (*c*) one nominated jointly by the Royal College of Surgeons in Ireland and the Royal College of Physicians of Ireland, and (*d*) two who are registered medical practitioners in Saorstat Eireann shall be elected by the persons who are for the time being registered medical practitioners resident in Saorstat Eireann. The members of the Council shall hold office for five years. Casual vacancies will be filled by the bodies entitled to representation with the exception of that of a direct representative, when the Council shall fill the vacancy for the unexpired term of office. Every person already registered in the general *Medical Register* will be registered without payment of a fee in the *Free State Register* if the application is made within one month after the establishment of the register. There will be also provided a separate list in the *Free State Medical Register* for any person who is registered as a medical and surgical practitioner in any British possession, self-governing Dominion, or foreign country on conditions more or less similar to those that apply to the Colonial List in the general *Medical Register*.

## Correspondence.

### PROPHYLACTIC VACCINATION OF THE NEWLY BORN AGAINST TUBERCULOSIS.

Sir,—Your judicial article on prophylactic vaccination of the newly born against tuberculosis (Journal, May 7th, p. 845) leads me to amplify the statistical information contained in Professor Calmette's article. Of M. Moine's section I say nothing, for I have not examined his data, but Dr. Biraud's data I have examined, and I think that the condensed form of his report—or of Professor Calmette's presentation of his report—may lead to misapprehension. In the first place, readers not familiar with the method of practical life-table construction might possibly suppose that Dr. Biraud's results are based upon 1,877 infants observed from birth to death or until the expiration of two years from birth, whichever event happened first. This is not so, for children passed out of observation for various reasons—for example, some of them might have been vaccinated within a few months of making the analysis, or no particulars might be available as to what happened to them after a few months from birth. In fact, the "exposed to risk" had dwindled to 679 by the end of the eighth month, and to 367 by the end of the twelfth month, so that the basis of discussion becomes, within a few months of birth, rather scanty. It is further to be remarked that

the real contrast between the rate of mortality of the vaccinated children and that of the general population is in the first four weeks of life, that is, in a period when the vaccination can—if I have followed the theory of the method—have had no effect, good or bad, upon resistance. In my opinion, assuming that no selective factor such as that suggested in your article biased the data, Dr. Biraud's analysis makes it probable that the mortality in the first year of life of the vaccinated children was no worse than that of ordinary children. Hence, if it could be shown that the rate of mortality upon children of the class of the vaccinated *was* very much worse than the average, a prima facie case in favour of the value of the process would have been made out, but only a prima facie case, because the data are scanty. I do not think this essential control has been furnished from French sources, at least in a form which most professional statisticians would regard as adequate, and the data published by Dr. Kjer-Petersen and Dr. Ostenfeld, so far as they go, throw doubt upon the rather sensational pseudo-controls, which are all Professor Calmette offers. Others will draw their own conclusions; personally I think it is a pity that the precise limitations of Dr. Biraud's analysis—limitation imposed upon him by the defects of the data—were not explicitly stated in Professor Calmette's paper.—I am, etc.,

Loughton, Essex, May 7th. MAJOR GREENWOOD.

## TUBERCULIN: IS IT A SPECIFIC?

SIR,—In the able article by Dr. F. G. Griffiths in the JOURNAL of May 7th (p. 827), "Tuberculin: is it a specific?" he raises several points that are of interest.

That tuberculin is specific in diagnosis is more than probable. Some time ago I examined the case-sheets of 209 ex-officers under observation for tuberculosis, all of whom, in addition to clinical and *x*-ray examination, were subjected to the modified von Pirquet test.

I found that those who reacted to dilutions of 1 in 500 showed clinical or *x*-ray signs of activity in 84 per cent.; those who reacted to 1 in 100 in 64 per cent.; and to 1 in 10 under 1 per cent.; there were no negatives. Of 58 of these patients who had tubercle bacilli in the sputum all reacted to 1 in 500 or 1 in 100. Anyone in the habit of doing these tests will agree that positive results in high dilutions in the healthy are so rare as to be of academic interest only. With regard to its specificity in treatment, tuberculosis is such a chronic disease that it is difficult to convince those who have not been in the habit of using tuberculin as to its value. I entirely agree with Dr. Griffiths as to its comparative valuelessness in marked fibrotic conditions. Scar tissue cannot be altered. Even in these cases, however, it is of value if there be signs of toxaemia.

I quite agree with Dr. Griffiths that the more sensitive the cases the better the results. In my experience, if the cases are subsensitive—that is, react to 1 in 10 but not to higher dilutions—tuberculin is not indicated except in asthma. The results obtainable in tuberculous asthma are, to my mind, the greatest proof of its specificity. In the non-tuberculous asthma it has no effect whatever. In tuberculous asthma, on the other hand, it apparently effects a cure, provided, of course, there is not some underlying cause of the asthma besides the tuberculous factor. It does not act suddenly like adrenaline. The general health improves, the attacks get less frequent and less severe, eventually they cease, at any rate for a considerable time. An observation of these cases of asthma for some years has led me to the conclusion that tuberculin must be specific in its action.—I am, etc.,

London, E.C.2, May 6th. F. E. GUNTER.

## THE TREATMENT OF DIABETICS AS HOSPITAL OUT-PATIENTS.

SIR,—May I claim a little space to join in the plea of Dr. Earl in your issue of May 7th (p. 831), that diabetic out-patients should be treated in special clinics and not in the general out-patient departments of hospitals? His interesting article shows how successful such a plan can be, while the difficulty of obtaining good results in the general out-patient departments is known to all physicians. As the clinical control of these cases is undoubtedly based on laboratory tests, the best results can be obtained only in close touch with a laboratory. Many hospitals have been quick to recognize this in establishing such diabetic clinics, and the benefit to the patients and the increased efficiency of the work has been an immediate reward in every case.

I think Dr. Earl has understated the possibilities of what can be done in such clinics. It would appear from his article that the out-patient clinic which he describes at Salford Royal Hospital does not undertake the initial treatment of any case with "ketosis or a short acute history" or "any case which requires insulin," such cases being admitted to the wards. At a similar diabetic clinic at King's College Hospital, London, we are in the habit of treating practically all such cases from the start as out-patients, with the exception of cases of coma, children under 16, those who live at too great a distance to attend hospital daily, and the intensely stupid patients. Two or three years ago we undertook insulin cases as out-patients with some trepidation, and mainly because of the lack of beds in the wards and the necessity of immediate treatment. But their treatment as out-patients has been so uniformly successful that we find admission to hospital unnecessary except for the above-mentioned types. Over fifty insulin cases have been started successfully in this way without any untoward results. It has been found possible to institute an accurate diet within a day or two and to entrust the patients with their own injections after at most a week. Some, indeed, take charge of their own injections after the first one. Most of the patients appreciate the fact that they need not interrupt their ordinary life entirely by admission to the hospital. We find, too, that, having been largely on their own responsibility in their own homes from the commencement, they learn the ways of "the diabetic life" with thoroughness and self-confidence.—I am, etc.,

R. D. LAWRENCE, M.D., M.R.C.P.
Biochemical Department, King's College Hospital, London, May 7th.

## TRAUMA AS A CAUSE OF AURICULAR FIBRILLATION.

SIR,—The interesting article on the above subject by Professor John Hay and Dr. Wallace Jones seemed to me a direct incitement to litigation under the Workmen's Compensation Act, which I very much deprecate. I therefore wish them to show not merely that auricular fibrillation in an apparently healthy heart has been part of a sequence following trauma, but what is the mechanism of its production, and what part has the autonomic nervous system played. A mere sequence of events is no proof of cause and effect.

It is not always easy to say what is a healthy heart. It is the simplest matter possible to pass an insurance examiner as a first-class life, but that is no evidence of the heart's capacity for any particular strain.

In my own case I have never been able to produce auricular fibrillation, no matter what the stress to which I have submitted my heart. In hill-climbing I can easily double the frequency of the beats, but no fibrillation.

On the other hand, I have known several, especially ladies, who with apparently healthy hearts get fibrillation on comparatively slight exertion. However, auricular fibrillation is divested of many of its terrors when you know that an attack can be arrested in about five minutes by the induction of the cardiac reflex of contraction.—I am, etc.,

Vichy, France, May 4th. JAMES BARR.

SIR,—I am interested in the letter from Dr. Harris (April 30th, p. 817), and am glad to find that he is in cordial agreement with our main contention, that sudden strain may induce auricular fibrillation in a heart predisposed to fibrillation by disease.

At this point, however, he comes to a full stop; and when we venture to say that "fibrillation may result from

physical strain in hearts that are apparently normal, so far as can be determined by ordinary clinical methods," Dr. Harris stigmatizes this guarded opinion as a "sweeping assertion," revealing himself as peculiarly lacking in a certain sense of proportion.

He evidently takes the view that fibrillation cannot occur in the absence of some pathological change and, in the presence of fibrillation, he would accept that—in itself, and alone—as evidence that the heart is diseased. In other words, fibrillation is all that is required for a diagnosis of myocardial damage. He sums up by saying that "there is no shred of dependable evidence produced which would suggest that trauma may produce fibrillation in a healthy heart." I am not sure to what he refers. It is not clear whether he suggests that we have not produced any evidence that the hearts of the patients we examined were normal, or whether he means that there is no dependable evidence of the experimental production of fibrillation by trauma in a healthy animal.

In so far as our cases are concerned, no lack of cardiac reserve was revealed on ordinary clinical examination, no enlargement of the heart that could be considered pathological, no evidence of valvular disease, nothing abnormal in the heart sounds, and no deviation beyond normal limits in the blood pressure. It was on these grounds that we felt justified in saying that the hearts were "normal so far as could be determined by ordinary clinical methods." With regard to the cases which we electro-cardiographed, I think, perhaps, Dr. Harris is inclined to lay more stress than is wise on such deviations from the normal as a slight slurring of the R deflection. In Case v, of course, the heart was admittedly damaged and the electro-cardiogram was frankly abnormal.

I cannot believe that Dr. Harris means that there has been no dependable evidence proving that fibrillation cannot be produced experimentally in a healthy heart, because many and various forms of stimulus—either chemical, electrical, or mechanical—are well known to start fibrillation of the auricles in the sound heart of an animal. The vital change is physiological and not pathological. Fibrillation is a functional disorder. Disease may predispose to fibrillation, but certainly does not cause it, and the presence of disease is not essential.—I am, etc.,

Liverpool, May 6th. JOHN HAY.

## RHEUMATIC INFECTION IN CHILDREN.

SIR,—With all respect I venture to differ from Dr. Leslie Thorne Thorne (May 7th, p. 855) when he says that enforced school attendance is the cause of the greater incidence of rheumatic infection in children attending elementary as compared with those who are sent to private schools. Surely the fundamental reason for the difference is to be sought in home environment, and in many instances constant, or frequent, exposure to damp, due to bad housing conditions, bad boots, insufficient or unsuitable clothing, with frequently no second change when the child gets wet, are the lot of the elementary school child, and lead to "growing pains," slight sore throats, etc. For these conditions the school cannot be held responsible; and, indeed, a child suffering from a slight "chill" is often better in a well warmed, well ventilated classroom than at home, where the mother may be out at work, and where the child, in any case, will almost certainly not be kept in bed.—I am, etc.,

EVA MCCALL, M.D., Ch.B., D.P.H.

London, W.1, May 9th.

## DAMP BUILDINGS.

SIR,—It is stated that an investigation is being carried out by the Royal Institute of British Architects into the causes and prevention of dampness in buildings, as a result of the report on rheumatism and rheumatic heart in children. Considerable stress was laid on this point of dampness in houses in the report. May I ask how the evidence of rooms and houses being damp was obtained? Was this evidence produced by authorities—the sanitary departments or other experts—or were the mere statements of patients and tenants accepted?

What constitutes a damp house or building? I have come across people who have declared their premises damp because warm vapour in a room has condensed on the cold walls, making them decidedly wet, but this can scarcely constitute a cause for a damp building.

Has any investigation been made in this connexion as to the incidence of rheumatic diathesis being inimical to tuberculosis?—I am, etc.,

Plymouth, May 7th. J. S. PEARSE.

## MEDICAL DEFENCE.

SIR,—We are directed to request that you will kindly publish in your next issue the following statement with regard to the circumstances in which the council of either of the two English defence and/or protection societies may be prepared to advise and/or defend and/or indemnify a member.

Subject to the provisions of the Articles of Association the council may on application from a member who is in benefit—

1. Advise on any matter connected with medical practice.
2. Initiate or defend or assist in defending, proceedings where a question of professional principle is involved.
3. In the event of an adverse verdict, or of a settlement out of court, provide indemnity against damages and costs of the other side.
4. Defend or initiate and carry through proceedings to vindicate a member's professional interests, honour, or character whenever they have been threatened or jeopardized.
5. Defend and/or indemnify a member in proceedings brought against him in respect of the act or omission of:

(*a*) A partner who is a member of any other defence or protection society with whom a reciprocal arrangement has been entered into.

(*b*) An assistant who is a member of any other defence or protection society with whom a reciprocal arrangement has been entered into.

(*c*) An assistant not himself a member of any defence or protection society, provided that the member has paid an additional annual subscription of 10s.

(*d*) A locum tenens, whether a member of any defence and/or protection society or not.

(*e*) A subordinate medical officer, including a house-surgeon or similar hospital medical officer, whether a member of any defence and/or protection society or not.

(*f*) A non-medical assistant or subordinate, such as a nurse, dispenser, *x*-ray operator, massage or laboratory assistant, save in a case where in the opinion of the council such non-medical assistant or subordinate was with the sanction of the member, whether express or implied, carrying out (i) a duty which should only be undertaken by a medical practitioner, or (ii) without medical supervision a duty which should only be undertaken by a non-medical assistant or subordinate under the orders and direct supervision of a medical practitioner.

—We are, etc.,

HUGH WOODS,
General Secretary,
The London and Counties Medical Protection Society, Ltd.

JAMES NEAL,
General Secretary,
The Medical Defence Union, Ltd.

May 7th, 1927.

# Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

THE House of Commons has this week considered the Scottish Estimates and Ministry of Transport Estimates, and commenced the Committee stage of the Trades Disputes and Trade Unions Bill.

The Parliamentary Medical Committee met at the House of Commons on May 5th and arranged that Lord Dawson of Penn should, on May 19th, address an open meeting of members of Parliament on the case against the Dogs' Protection Bill, in reply to statements made in the House in support of that bill. Lord Dawson will also answer questions on the subject. In view of the recent appointment of a Select Committee on the registration of opticians, the Parliamentary Medical Committee decided to support the amendment which Sir George Berry and Dr. Vernon Davies had put down declaring that it was inadvisable to give a second reading to the Optical Practitioners' Registration Bill, which was the first order of the day on May 13th. The Committee also heard a statement from

Sir Frank Colyer, who, on behalf of other medical men practising dentistry, explained the circumstances in which he had taken his name off the *Dental Register*. A discussion followed on this statement, but the Committee took no decision.

### Experiments on Animals.

In the House of Lords, on May 4th, Lord Banbury opened a discussion about experiments on animals by asking how many inspectors were appointed under the Cruelty to Animals Act, 1876. He said he made no accusation against the inspectors. He had no reason to doubt they were doing their duty properly and efficiently if that were within their power. The Home Secretary had said in the Commons that there were two whole-time inspectors who had last intervened on March 25th, 1926, to prevent an animal suffering prolonged and agonizing pain. Could Lord Desborough, who was to answer for the Government, justify the statement by professors and doctors that there never was cruelty, and that they could trust the inspectors to carry out the Act? Lord Banbury said that 242 places were licensed on April 11th for operations on animals, and quoted statistics of the number of operations performed in 1925. He calculated that each inspector would have to inspect 4,701 experiments yearly. Two men, however excellent, could not carry out these duties properly. Lord Desborough said that down to 1913 there were two part-time inspectors for Great Britain. In that year, after a Royal Commission, two whole-time inspectors were added. Sir James Russell, a part-time inspector, died, and the number was reduced to three, but the third, Sir George Thane, gave practically the whole of his time to the work. When Sir George retired, in May, 1922, the staff was reduced to two whole-time inspectors because of the need for economy in public expenditure. That need continued. The Home Office agreed that, for efficiency, three whole-time inspectors would not be too many, and four would be still better. The point of view of Lord Banbury, who suspected violation or evasion of the law, need not be taken into account. Licence holders did sometimes commit breaches of the Act or the conditions of their licences, but almost invariably through negligence or failure to understand an intricate and technical piece of legislation. Wilful evasion of the Act was practically unknown. The experience of the Home Office for many years had been that licence holders as a body were willing and anxious to comply with the letter and spirit of the Act, and to assist the Home Office in its administration. He was informed that more experiments were made at University College than at any other one place. In the last eighteen months its laboratories had been visited thirty times without notice by an inspector. Inspectors had a great deal more to do than to inspect; they had to be highly qualified persons, able to give advice when applied to by men and schools which wished to carry out some special piece of scientific work; and it would undoubtedly be a great benefit if the country could afford money for the purposes suggested. The Home Office, however, was not likely to approach the Treasury with the request. Lord Haldane said that the great bulk of the work done by the inspectors was paper work, scrutinizing the nature of the research proposed to be made and whether it involved pain. The inspectors did not run about, though they paid occasional visits to see that the conditions of the law were observed. Lord Haldane's view was that there was little violation of the Acts in this country. He was not sure that the Acts did not go too far. A few days previously a distinguished young physiologist had come to see him, and had explained that an experiment had to be made, and should be made on a dog. It was not serious, but could not be made under an anaesthetic. That physiologist said: "There is only one way for it, and I have come up to be vivisected," and he was vivisected. For several days he was in one of the hospitals, remaining in bed during part of the process. Lord Haldane said that some of the experiments stopped by the Act were experiments which human beings with a desire for knowledge were ready to undergo. He did not think it desirable that such experiments on men should be extended. Some of the provisions of the Acts went so far that, although processes were painless, they were hampered by the condition that anaesthetics must strictly be used, and that the animal must not be allowed to live. Lord Knutsford said the removal of a flea from one dog to another was an experiment under the Act. In all England and Wales only 267 places were licensed for vivisection, and 68 of these were in London. In the opinion of many people two whole-time men could do the work perfectly well. The irregularities last year were that one woman investigator immersed, without a licence, some trout in polluted water, and that another, holding certificate A, made simple inoculations into cats without authority. Lord Danesfort said he was not an antivivisectionist, but would be very sorry to see an extension of the powers given by the Act of 1876. The Royal Commission of 1912, having heard all the evidence from the scientific side, concluded that the existing inspectorship was insufficient. Unfortunately, the Commissioners' recommendation to have four full-time inspectors had not been carried out to the full. Lord Banbury said that the results to the animals concerned of breaches of the licence were just as bad if the mistakes were through ignorance. He trusted that economy would not prevent the Home Office from appointing more inspectors, and suggested that £3,000 a year would cover the cost. He withdrew his demand for papers, and the debate closed.

*A Parish Medical Officer in Skye.*—In an answer to Mr. Johnston, Sir John Gilmour said the special Commissioner appointed by the Scottish Board of Health had found that professional charges brought against the parish medical officer of Strath, Skye, had not been substantiated and ought never to have been made, and that there was no other ground on which his dismissal from the parish appointment would be justified. After consideration of the Commissioner's report, the Board had decided that this was a case which called for the protection afforded to parish medical officers in the Highlands and Islands by statute. Sir John concurred in this decision. In his question Mr. Johnston stated that the parish council of Strath had announced that it would resign unless given freedom to terminate the appointment.

*After-effects of Lethargic Encephalitis.*—On May 4th Mr. E. Brown asked whether the attention of the Home Secretary had been called to a case at the Central Criminal Court where a victim of encephalitis lethargica had been sent to prison with hard labour, although the judge had agreed that the prisoner required treatment, not as a criminal, but as an afflicted person. Sir William Joynson-Hicks said that after consideration he could not advise a remission of sentence. The young man was reported to have suffered from encephalitis lethargica in 1919, but was not now considered to be certifiable either under the Lunacy Acts or under the Mental Deficiency Act. All the relevant facts were before the judge when he decided to send the man to prison, where he was now under special mental observation in the prison hospital. Mr. Brown asked whether the Home Secretary did not think there should be an alternative in such cases. The Home Secretary said that was a matter for legislation by the House of Commons. Dr. Vernon Davies pointed out that the prisoner had been sentenced to nine months' imprisonment with such hard labour as he was capable of doing. He asked whether the Home Secretary would endeavour to hasten the passage of the Mental Deficiency Bill. In a later answer, on May 10th, Sir William Joynson-Hicks said the prisoner was 21 years old and therefore the question of committing him to the institution at Winchmore Hill under the control of the Ministry of Health did not arise.

*Approved Societies and Massage and Electrical Treatment.*—Answering Mr. Bowerman, Mr. Chamberlain said that if massage and electrical treatment were added to the list of additional benefits under the National Health Insurance Acts he would aid approved societies to secure for their members the necessary treatment under satisfactory conditions and on reasonable terms. Before making a regulation adding the treatment to additional benefits, he would have to be satisfied that a reasonable number of societies desired to amend their existing schemes.

*Small-pox.*—On May 9th Sir Kingsley Wood told Lieut.-Colonel Howard-Bury that twenty-seven deaths among persons suffering from small-pox had so far been reported in England and Wales during the present year. In some cases the death certificates had not yet been received. In reply to other questions, Sir Kingsley Wood stated that, in view of the danger of an epidemic, the Ministry is doing all it can to recommend vaccination, and is drawing the attention of school authorities to the matter.

*Cost of Medical Inspection of Schools.*—On May 9th Lord Eustace Percy, in reply to Dr. Vernon Davies, gave in tabulated form the number of school children examined by the medical officers of the Lancashire education authority for the last seven years. He said that in 1921-22 the estimated equivalent of whole-time officers engaged in school medical service work was 15.2, and the estimate of total salaries in respect of school medical service was £15,765. The number of inspections (routines, specials, and re-inspections) was 74,246. In 1926-27 the comparable figures were 13.6, £13,087, and 95,106. He could not state the average cost of medical services for each examination made, as the school doctor's work included many other duties connected with the school medical service besides medical inspection.

*High Grade Certified Milk.*—On May 10th, in reply to Brigadier-General Clifton Brown, who asked why producers of Grade A tuberculosis tested and certified milk were now to be brought under the further control imposed by the Milk and Dairies Order, 1926, Sir Kingsley Wood said producers of the higher grades of milk had always been subject to the statutory requirements applying to milk producers generally.

*Baths at Spas.*—The Minister of Health has not sanctioned the levying of a local rate for the upkeep of privately owned baths at any place other than Woodhall Spa, Lincolnshire. Any application in circumstances similar to those at Woodhall Spa would be considered.

### *Notes in Brief.*

Three hundred first-aid dressings have been ordered for the use of the Metropolitan Police in the streets.

In 1926 there were 88,000 tons of machine-skimmed condensed milk imported into the United Kingdom.

# Obituary.

## ERNEST HENRY STARLING, C.M.G., M.D., F.R.S.,

Foulerton Research Professor of the Royal Society,
University College, London.

*(With a reproduction of a recent photograph by Professor Raper of Manchester.)*

LAST week we had with sorrow to announce the death on board ship, off Kingston, Jamaica, of Professor E. H. Starling at the age of 61. Of late years he had had indifferent health and had suffered from disabilities under which one of less heroic spirit could not have continued to work strenuously. His enthusiasm for the discovery of new truths was unimpaired, and his mind was so sympathetic and alert that it was difficult to believe he was not a sound man. Nevertheless, evidences of diminishing capacity for work without undue fatigue were obvious to his friends and a source of anxiety to them.

At the close of the winter session, during which he had been daily occupied with arduous experiments, he was very tired. The weather was cold and dull and he longed for sunshine and warmth. He therefore decided to take a voyage to the West Indies, in full hope that this would restore his energies and enable him to continue with enjoyment the experimental work with which he was occupied. However, that was not to be, but he had the satisfaction of going down with his flag flying, as he would surely have desired.

## LIFE AND WORK.

BY

C. J. MARTIN, M.D., F.R.S.

Ernest Henry Starling was born in 1866. His father, H. H. Starling, was Clerk to the Crown, Bombay. The family of seven children had, perforce, to be educated in England. They therefore saw but little of their father and were brought up by their mother, a very extraordinary woman, and it is to her influence, by heredity and nurture, that Starling owed his determination, mental alertness, and much of his charm. As the eldest boy, in the absence of a father, he early acquired a sense of responsibility and capacity for managing his affairs, and was, in some respects, unusually mature for his years.

He was educated at King's College School. He left at 16½ years of age, having matriculated at the University of London with honours, and proceeded to the study of medicine. He chose Guy's Hospital because his uncle was a Guy's man.

At this time his ambition was to be a physician and live in Harley Street, and it was not until a few years later that he began to doubt the all-sufficiency of this ideal and to contemplate the possibility that he might be able to devote himself to an academic career and perhaps become a discoverer himself. As soon as he touched the study of natural science it was clear that Starling had found his *métier*. The causal relation of facts enthralled him. He was intensely curious and had a naturally scientific mind. He was gifted with fine intellectual machinery, a good memory, industry, and possessed of great powers for work, and it was soon clear to his teachers that they had a very exceptional pupil. The teachers of natural science at Guy's in those days were men of distinction, but they only called for a few hours weekly to deliver their lectures. The one who made a great impression upon Starling was Dr. Debus of the Royal Military Academy, Woolwich, who gave part of the lectures on chemistry. He was a fine teacher, and the enthusiasm with which he expounded the elements of chemistry was infectious.

At the examination in preliminary scientific subjects at the University, Starling obtained the first place in chemistry and botany, and second place in physics. He obtained so many medals and prizes as he proceeded through his medical course that an account of these academic victories at university and hospital would be wearisome. About two-thirds of the academic honours available were secured by him, including a free studentship at Guy's Hospital. These various college and university scholarships sufficed to maintain him, and if he had liquidated the many gold medals awarded to him he would have been able to enjoy comparative affluence.

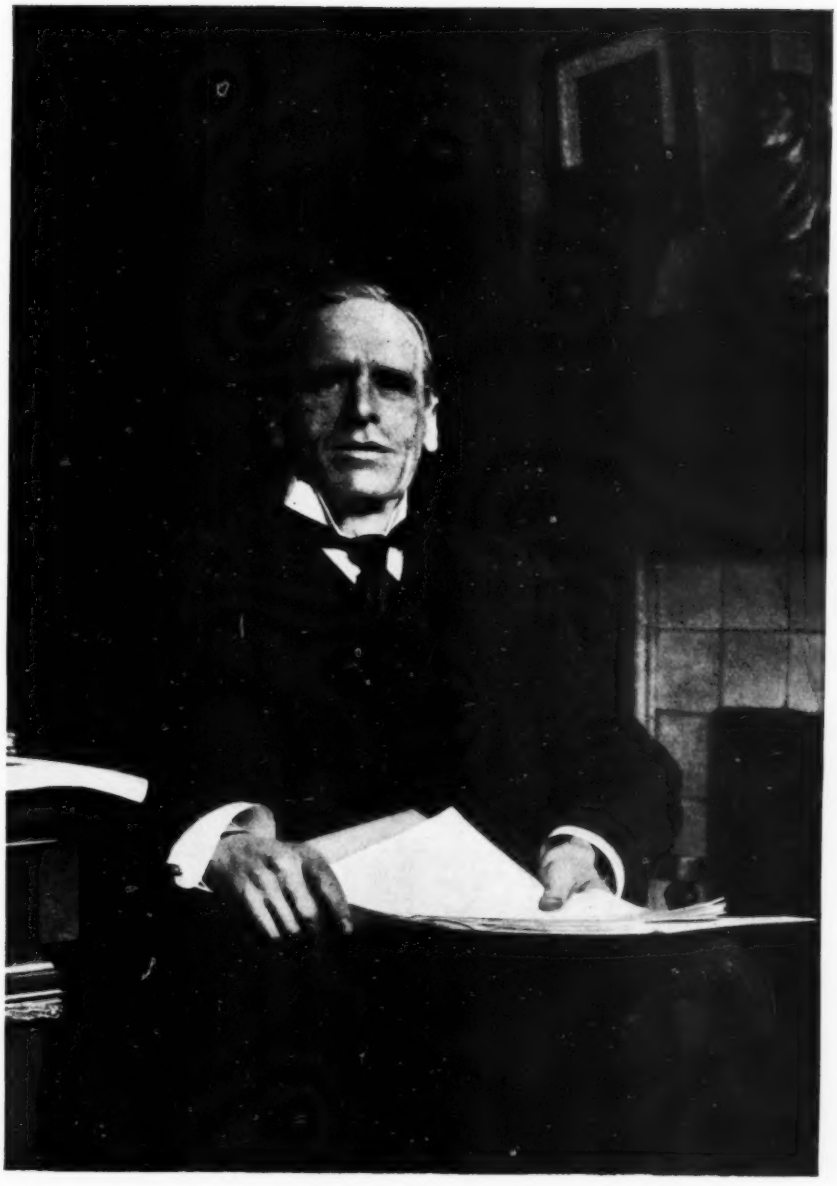
Physics and chemistry attracted him and the generalization of biology, but it was when he came to study physiology that he met his fate. It cannot be said that his affection for physiology was due to his teaching at the hospital; it was largely his own discovery, but Foster's textbook made a great impression upon him.

After two years' study of physiology, during which he read many original papers, including all the back numbers of the *Journal of Physiology*, he had determined, I think, to become a physiologist, if such a career was economically possible. He had felt the deprivation due to his inadequate knowledge of German, so, after disposing of his second medical examination in 1886, he went, largely with the idea of improving his German, for a few months to Heidelberg, and worked in Kuhne's laboratory. He returned at the end of the year with his hair *en brosse*, much teutonized, and more than ever determined to become a physiologist. However, he had to put these aspirations aside for awhile and devote himself to the study of practical medicine. This he did with his usual enthusiasm. Starling found great satisfaction and enjoyment in clinical work. The human side appealed to his sympathetic nature and the immediate value of the application of knowledge to his practical mind. If it had been possible to devote himself whole-heartedly to the study of medicine, as is now possible by the institution of full-time professorships, Starling would have been as happy investigating disease as in a physiological laboratory. Indeed, not many years ago he seriously considered accepting such a position.

Having completed his medical studies and occupied the position of house-physician and house-surgeon at the hospital, Starling was confronted with the problem, how he was to live if he were to follow his desire and devote his life to physiology.

With his brilliant career at the hospital, the profession of a physician was open to him and success undoubted. He was keenly interested in medicine and pathology, and the temptation to follow the line of least resistance and greatest promise of reward was considerable. However, in 1889, he determined to try the rougher path and became demonstrator in physiology. The rewards of this office were minute, and Starling told me that he owed the possibility of giving his allegiance to science to a British Medical Association scholarship for medical research. The scholarship was worth £150 a year, and this addition to his slender salary kept him going. Next year, owing to the death of Wooldridge, a vacancy as joint lecturer on physiology occurred and Starling was appointed. On the termination of the British Medical Association scholarship he was appointed to the research scholarship of the Grocers' Company, of the value of £250 per annum. It was not then so easy to embark on a scientific career without financial resources as it is now, and it is terrible to think how one of Starling's glorious attainments was nearly deterred.

He was confronted, not only with the problem of how he was to continue to subsist on one-third of a salary which was never intended to command the whole services of a physiologist, but how he was to secure a physiological laboratory to work and teach in. The Grocers' scholarship temporarily solved the first problem, and he determined that adequate accommodation and equipment for teaching and research in physiology should ere long, by some means, be obtained. Meanwhile, being but one of three joint lecturers, he was able to arrange to go and work abroad occasionally. In 1893 he went to Breslau to work with Heidenhain, and later, for a few months, to the Pasteur Institute, as he was greatly impressed by Metchnikoff's discoveries about phagocytosis. In order that these might be more available to English students, he and his wife translated Metchnikoff's lectures on comparative inflammation.



ERNEST HENRY STARLING.

Until his hopes for a physiological laboratory should materialize, Starling did his best to secure some improvement of the arrangements for practical teaching and demonstration with the funds available; meanwhile he repaired to Schafer's laboratory at University College to carry on his researches. Bayliss was also working in the laboratory, and here began a scientific partnership which lasted on and off for thirty years. The two complemented one another in many respects. Whilst both possessed scientific imagination of the highest order, Starling was more ardent and forceful, eager to translate ideas into action, but rather bored with details of technical method. He had never been interested in doing things with his hands except climbing, although, later, he became a most beautiful and dexterous operator. Bayliss was the philosophical student, calm, with better critical judgement. He read widely and had a wonderful knowledge of scientific literature, was an excellent mechanic, and found enjoyment in the development of the technical methods of research. How fruitful this partnership was will be seen from the account below of Starling's scientific work.

The equipment at Guy's Hospital steadily improved, and he and Bayliss did their work on the innervation of the heart there. By 1895 Starling had planned a really good physiological institute for Guy's Hospital and had secured the assent of the authorities to its erection. These laboratories were completed in 1897, and were, at that time, the best laboratories for physiology in London. The amount of time and effort involved in this accomplishment was considerable. Unwilling authorities had to be persuaded to provide territory and funds, and colleagues to make sacrifices of their own legitimate aims, and although it was becoming recognized that Starling was going to be a great man and was an ornament to the staff, this was no easy matter.

Not long after the opening of the new physiological laboratories at Guy's Hospital the Jodrell Chair of Physiology at University College fell vacant owing to Schafer's acceptance of the professorship at Edinburgh. In 1899 Starling was appointed. It was a wrench to leave his fine new laboratories, to the construction of which he had devoted so much time, but the emoluments of the Jodrell Chair were greater, and the conditions at University College he deemed more favourable to the realization of his ideals. Moreover, he was determined that it should not be many years before he would have a new institute of physiology at University College, for the planning of which the Guy's laboratories would have served as useful exercise.

This determination came to fruition in 1909, when the present fine Institute of Physiology was opened. Starling's plan was not merely for a new physiological school, in which he was naturally more particularly interested, but he wanted all the medical sciences at University College to have the advantages of more commodious and nobler buildings. His original scheme was for an Institute of the Medical Sciences, including anatomy and pharmacology, as well as physiology, with a central library. At first only the physiological section was built, but a few years ago the erection of the whole institute, as originally contemplated, was rendered possible by a generous gift from the Rockefeller Foundation, which was desirous of devoting funds in the interest of medical science in London. That they chose this particular means of fulfilling their aims was largely, if not entirely, due to Starling, and the noble Institute of Medical Sciences with which University College is now endowed is a fine material monument to the memory of one who not only helped to build up a great school of physiology in London and obtained an appropriate habitation for it, but was as unsparing in his efforts to secure similar advantages for the other medical sciences.

In 1923 Starling retired from the Jodrell Chair and was appointed to a Foulerton Research Professorship of the Royal Society. He still continued to work at University College, but was relieved of all administrative duties and all teaching, except that of a small band of research pupils.

His laboratories continued to be a centre of great activity, and a limited number of distinguished young physiologists from this country and abroad still enjoyed the advantage of working in close communion with one of the greatest masters of experimental physiology. It was a happy family.

### STARLING'S PHYSIOLOGICAL RESEARCHES.

*"Only by following out the injunction of our great predecessor (Harvey), to search out and study the secrets of Nature by way of experiment, can we hope to attain to a comprehension of 'the wisdom of the body and the understanding of the heart,' and thereby to the mastery of disease and pain, which will enable us to relieve the burden of mankind."* (Starling, Harveian Oration, Royal College of Physicians, 1923.)

Starling's interest in physiology was general, but the subjects for investigation which particularly attracted him were those physiological processes which seemed capable of interpretation in terms of chemistry and physics. Whilst realizing that adaptation was the essence of organism and had no counterpart in inanimate nature, he had not much sympathy with the neo-vitalists. In his view, if the contraction of muscle was not understood, it was because we did not know enough about physics and chemistry or about muscle.

He was always, from his student days, fascinated with the problem of the heart and the adjustment of its action to varying conditions of the body, and his first paper, written with Bayliss in 1891, was on the electromotive phenomenon of the mammalian heart. Waller had recently studied the electrical variation of the excised heart, and also of the heart *in situ*, by leading off from the neighbourhood of the apex and base respectively. It was evident to Starling that by photographing the movements of the capillary electrometer, connected with electrodes placed in different positions on the naked heart in the anaesthetized live animal, much might be learnt of the nature of the cardiac contraction; in fact, that a new method of observation was at the disposal of the investigator. At that time any sort of muscular continuity between the auricles and ventricles was denied, and the view that conductivity was due to some nervous network supplying the fibre was in favour. In this research he enjoyed the co-operation of Bayliss. They set out to ascertain the course and time relations of the wave of contraction in the ventricle, the nature of the transmission from auricle to ventricle and throughout the ventricle, and to examine critically Frédéricq's reasons for regarding the nature of the ventricular contraction to be tetanic.

They succeeded in showing (1) that the ventricular contraction is a single wave starting from the base, (2) that there is a natural block at the auriculo-ventricular groove, (3) that the rate of transmission of the contraction wave was about 5 metres per second. This sounds commonplace at this time when the electro-cardiograph is in general use for clinical diagnosis, but their observations not only formed an important step in the development of our knowledge of cardiac contraction and in the interpretation of disease of the heart, but, by showing what valuable information could be obtained by the electrical method, stimulated its employment and accelerated the development of the electro-cardiograph.

They next explored the separate action of the vagi and accelerator nerves on the auricles, on the ventricles, and on the conducting power of the auriculo-ventricular junction in the mammal. The effects of these nerves on the hearts of frogs and tortoises had been previously studied by Gaskell and Heidenhain, and that of the vagi upon the auricle of mammals. Bayliss and Starling completed the story, showing that there was no essential difference between the hearts of mammals and cold-blooded animals; that the vagus depresses conduction in auricle, auriculo-ventricular junction, and ventricle; and that the accelerator nerves had the opposite effects on all three structures. Two other important papers dealing with the mechanism of the circulation were published by Bayliss and Starling at this time. One was an exhaustive study of the simultaneous changes in the arterial and venous pressures of various regions of the body under a great variety of experimental conditions. The results showed the universal applicability of the principle of the circulation worked out by Ludwig. They said, in their paper, that the effects produced were such as might have been predicted by anyone with a knowledge of the elementary principles of the circulation. However, nobody had predicted

them. The last contribution of this first series of papers on the circulation was an analysis of simultaneous pressures in the aorta and ventricles of the heart *in situ*, by an ingenious method which was a vast improvement on any hitherto devised. They used a continuous photographic record of the changes in volume of a small air-space at the end of a capillary glass tube connected with the aorta and ventricle respectively. This method was free from inertia and aperiodic, and they succeeded in obtaining a true record of the rapid variations occurring in the ventricle and aorta, and the precise relation of these to one another. Their measurements have been the standard of reference ever since.

### The Conditions Determining Transudation from the Vessels and Lymph Flow.

In 1892 Starling for a while relinquished the study of the blood circulation and turned his attention to the mechanism of lymph flow. The conditions determining the equilibrium between the liquids in the blood vessels and tissue spaces required exploration. Was lymph a transudation or an excretion? Heidenhain had recently published a stimulating paper on lymph formation, in which he concluded that, normally, filtration played no part in the formation of lymph, so, in 1892, Starling went to work in the Breslau laboratory.

Heidenhain had distinguished two kinds of lymphagogues, and under his inspiration Starling set to work to make a more detailed analysis of the effects of one of them—peptone. In summarizing his results he adopted the interpretation of Heidenhain that the experimental facts concerning lymph formation could not be explained by filtration and that it was necessary to suppose a selective activity of the vessel wall. However, on returning to this country, he continued to work energetically at the problem of lymph formation, and repeated all of Heidenhain's experiments. He was able to confirm his facts, but came to doubt the correctness of his interpretation. He searched for evidence of lymph-secretory nerves, but found that the nervous system could only influence lymph flow by altering vascular conditions. After years of experimenting he came to the conclusion that it was unnecessary to suppose a secretory activity of the endothelium, and that there was no experimental fact inconsistent with the view that lymph formation was a function of two factors—permeability of the vessel wall and intracapillary pressure. Nevertheless, there were a number of observations equally unintelligible on either hypothesis, and further work with Leathes and Tubby on the absorption of various solutions from the pleural cavities only emphasized that there was yet another factor concerned in determining whether fluid passed in or out of the capillaries.

In 1896 Starling discovered that the missing factor required to afford a complete interpretation of the phenomena was the osmotic pressure of the colloids to which the walls of the capillaries are relatively impermeable. It had hitherto been supposed that the osmotic pressures of proteins, being so insignificant compared to that of salts, they must be of no account in physiological processes. The reverse is indeed the case, because it is only to such that the membrane is impermeable.

He therefore set to work to measure the osmotic pressures of the proteins in serum and found them to be, though small, of the order of magnitude of the capillary pressure. The problem was solved. The hydrostatic pressure and the osmotic pressure supplied the balance of forces necessary to explain the experimental observations. These, together with altered permeability of the endothelium, are capable of supplying a reasonable interpretation of oedema and pleural effusion, and formed the subject of his Arris and Gale lectures to the College of Surgeons in 1926.

Starling's work on lymph formation occupied five years, and is of the best he did. After long-continued and difficult experimentation, combined with observation of the highest order of accuracy, this hitherto obscure, but fundamentally important, region of physiology was finally illuminated by his dexterous experimentation and triumphant imagination.

### The Movements and Innervation of the Intestines.

When Bayliss and Starling undertook this study, the nerve supply to the small and large gut had been carefully determined by Langley and Anderson, but of the working of the neuromuscular mechanism there were many discrepancies as to fact and opinion.

After eighteen months' careful experimenting, with many appropriate recording methods devised for the purpose, they were able to reduce the previous chaos to order and to summarize the main facts concerning intestinal movements in a few simple statements. (1) That peristaltic contractions are true co-ordinate reflexes carried out by the local nervous mechanism and independent of the connexion with the central nervous system. (2) Local stimulation of the gut produces excitation above, inhibition below. (3) Besides the local mechanism, every part of the gut is subject to the control of the central nervous system through the splanchnics and vagi, the former being inhibitory and the latter containing both augmenting and inhibitory fibres. This was as far as understanding of the matter progressed until Cannon introduced the method of observation by means of *x* rays in an animal fed upon a bismuth meal.

### The Mechanism whereby Pancreatic Secretion is Normally Evoked and Adjusted to Requirements.

The brilliant discoveries of Pavlov had determined the order of events in gastric secretion and their co-ordination through the agency of the nervous system, but although he had found that no secretion from the pancreas occurred until the acid chyme reached the duodenum, just how pancreatic secretion was called forth in an appropriate manner had baffled this great experimenter and his pupils. Popielski had determined that the introduction of acid into the upper part of the small intestine caused secretion from the pancreas, notwithstanding previous section of the vagi and sympathetic or even complete extirpation of the solar plexus. He concluded, therefore, that secretion must be brought about reflexly, by means of some local nervous apparatus.

Bayliss and Starling started their investigations with the idea of deciding where this peripheral nervous mechanism was. They verified all the facts stated by the Russian physiologists, but were unsuccessful in proving the existence of any nervous mechanism controlling pancreatic secretion. Nor could they discover how secretion was brought about until they made the crucial experiment which led to the discovery of secretin.

I happened to be present at their discovery. In an anaesthetized dog, a loop of jejunum was tied at both ends and the nerves supplying it dissected out and divided so that it was connected with the rest of the body only by its blood vessels. On the introduction of some weak HCl into the duodenum, secretion from the pancreas occurred and continued for some minutes. After this had subsided a few cubic centimetres of acid were introduced into the enervated loop of jejunum. To our surprise a similarly marked secretion was produced. I remember Starling saying: "Then it must be a chemical reflex." Rapidly cutting off a further piece of jejunum he rubbed its mucous membrane with sand in weak HCl, filtered, and injected it into the jugular vein of the animal. After a few moments the pancreas responded by a much greater secretion than had occurred before. It was a great afternoon.

Bayliss and Starling followed up their discovery in many important directions which space forbids me to mention. A method of obtaining natural pancreatic juice was now available, and they made full use of their opportunities to study trypsinogen and its conversion into trypsin by enterokinase. Their observations were subsequently summarized and their significance illustrated in their Croonian lecture to the Royal Society in 1904.

Starling was also moved by them to much constructive thought and further research on the chemical integration of the bodily functions generally. He proposed the name hormones or chemical messengers for all such active principles formed in one part of the body and distributed by the

circulation to excite the normal functioning or stimulation of growth of other parts. This fascinating story, embellished with a wealth of illustration, formed the subject of his stirring Croonian lectures to the Royal College of Physicians in 1905, entitled "The chemical correlation of the functions of the body."

### Movements and Adaptations of the Isolated Heart.

The behaviour of the heart had interested Starling from the time he was a house-physician. His earliest work was upon the heart, and, though he diverged into other fields of investigation, the questions which intrigued him at that time always retained their fascination. In 1909 he returned again to their investigation. He had been attempting to dissociate the effects of asphyxia on the circulation into those due to diminished oxygen and increased carbonic acid tension respectively. He used the "spinal animal"—that is, one in which the brain above the pons has been destroyed. He obtained some interesting information, but the observations were difficult to interpret until he should be able to separate the effects of alteration in the gaseous composition of the blood upon the heart itself.

To arrive at this it was necessary to be able to record the influence of variations of $CO_2$ and $O_2$ upon the mammalian heart isolated from the nervous system and not subjected to any simultaneous modification in its nutritive state, in the inflow of blood, or in the amount of work it was called upon to do. To satisfy these requirements the heart must be isolated from the rest of the body and at the same time must receive a constant supply of perfectly oxygenated blood, and be working under mechanical conditions completely under the control of the experimenter.

This was accomplished by a device, now famous, known as Starling's heart-lung preparation in which the lesser circulation is intact, but the only paths from the left ventricle to the right auricle are: (1) through the coronary arteries, (2) through an artificial connexion in which the resistance can be regulated. By appropriate means the pressure and flow in different parts of the circulation can be recorded and also the volume of the blood circulation per unit time and the work done by the heart. If required, the gaseous metabolism of the heart contracting under various conditions can be studied. The limited amount of blood in circulation permits analysis of its contents from time to time. Further, the method is admirably adapted to the observation of the direct effect of drugs, etc., upon the mammalian heart, working under every conceivable condition. Nor does this exhaust the possibilities of Starling's heart-lung preparation as an engine of research into cardiological problems. The flow through the coronary circulation can, if necessary, be diverted and measured so that change in the blood supply to the cardiac muscle can be determined.

After the perfection of this technique, a series of discoveries were made by Starling and his pupils which, in conjunction with those of Lewis, have made the laboratories of University College as famous a focus of research upon the circulation as was the laboratory of Carl Ludwig sixty years ago. The years immediately succeeding the development of this method of studying cardiology were the most productive, from the point of view of scientific output, in his career. He was surrounded by enthusiastic and devoted pupils drawn from all over the world. He had plenty of problems for them to attack, with every prospect of a reasonable reward for their efforts, and he was unsparing in helping them towards their solution, often performing the more difficult parts of the experiments himself and subsequently writing their papers for them.

It is only possible to indicate the principal researches undertaken and the more fundamental facts established by this happy band of discoverers until it was scattered by the outbreak of war in 1914. Detailed accounts will be found in the publications from his laboratory between the years 1910 and 1915. They are in no case merely qualitative observations but quantitative determinations. They occupy hundreds of pages of the *Journal of Physiology* and other journals during this period. They show the marvellous power of the heart, apart from the nervous system, to adapt its work in accordance with the needs of the body as a whole and the exquisite mechanisms to enable it to do this within wide limits, without embarrassment or permanent injury.

In the first case, the effects of variations in the tensions of $O_2$ and $CO_2$ in the blood upon the diastolic volume and output of the heart, on its capacity for work and on the flow through the coronary arteries, were determined. The heart was found to have an astounding power of utilizing the oxygen in the blood. When an isolated heart was fed with blood from an asphyxiated animal, the heart removed all but traces of oxygen.

The conditions controlling the rate of the heart beat were studied, and the only influences found to modify the rate of the isolated heart were temperature, the volume of the inflow, and adrenaline. The maximum output of the heart was measured and found to be 3 litres a minutes for a dog's heart weighing 50 grams. Important observations were also made upon the energetics of the heart by determining the $O_2$ used per unit of work done. The respiratory quotient of the normal and diabetic heart was ascertained, and from these two sets of observations the efficiency of the heart as a machine working under various loads was determined. The ventricular output was discovered to be independent of the arterial pressure, but, on the other hand, it was found to be dependent upon inflow. From this it appeared that as the heart dilated and its fibres were stretched, it worked with greater efficiency. This was subsequently shown to be the case by his distinguished pupil Lovatt Evans.

Their experiments upon the flow of blood through the coronary arteries showed that this flow was primarily dependent upon the arterial pressure, but that dilatation of the coronary system occurred when the $CO_2$ tension in the blood increased, when adrenaline was added, and most markedly when some metabolites, the product of the heart's own activity, were added to the blood circulating. In the latter circumstances the increased flow through the coronary arteries was out of all proportion to the pressure in the aorta, a further indication of automatic adjustment to a condition of stress.

Starling having supplied us with a new method of inquiry, many competent physiologists could have ascertained much of the information outlined above, but there was one discovery which is peculiarly the product of his genius—namely, that cardiac muscle, like voluntary, contracts more forcibly as it is stretched even up to the point when the texture is fractured. Therefore, to work at greatest efficiency a heart must first dilate, which it inevitably does, as the pressure in front of it increases. This is what Starling calls the "law of the heart." As he said in the fine Harveian oration he delivered before the College of Physicians in 1923, when he expounded in simple and beautiful language the results of his researches into the movements of the heart, "The heart has thus the power of automatically increasing the energy evolved at each contraction in proportion to the mechanical demands made upon it, behaving in this way almost like a sentient, intelligent creature."

### Starling's Services during the War.

After war broke out Starling became very unsettled. He wanted to go into the fighting line. Persuaded, if not convinced, that this was not the most suitable manner in which to satisfy his strong tribal instincts, he joined the R.A.M.C. as a captain, and was for some time a medical officer at the Herbert Hospital.

Later, as the scientific resources of the country were mobilized, he was made director of research at Millbank, and was busy experimenting with defensive methods against poison gases. In this he rendered invaluable service to his country, and no one was better able to control a research laboratory. However, at the end of 1916 he was exalted to the rank of lieutenant-colonel and sent as chemical adviser to Salonica, where he had nothing to do. Maybe his impatience of official methods embarrassed the authorities. In 1917 he resigned his commission, deeming that he could be of greater service as a civilian.

At that time food shortage seemed most likely to decide the issue, and he became chairman of the Royal Society Food Committee, and was largely responsible for the value

of the advice given by it to the Government. Subsequently he was Scientific Adviser to the Ministry of Food, and British Scientific Delegate on the Inter-Allied Food Commission.

In all these capacities he rendered yeoman service. He soon had a mastery of the necessary facts, and he was by nature and training able to marshal them comprehensively and arrive at definite conclusions. He was never "havering," and he impressed all those statesmen and officials with whom he had to deal. It is doubtful whether any other of our physiologists could have served us so well.

### Later Researches on the Circulation.

For awhile, after the war, Starling's work was seriously curtailed owing to ill health, which finally necessitated a serious surgical operation. However, in 1920 he was back again at work, with Anrep, on the central and reflex regulation of the circulation by an ingenious cross-circulation method, built up on his heart-lung preparation. In this method, the circulation through the brain of an animal is entirely under the control of the experimenter, while the animal's own heart supplies the rest of its body.

By this dexterous device they were enabled still more to unravel the complex mechanisms of the adjustments in the vascular system. A notable discovery was that, whereas rise of aortic pressure leads to dilatation of the blood vessels as long as the depressor nerves are intact, change in the blood pressure in the supply to the brain produces the reverse change in the pressure of the rest of the body. These fundamental laws of vasomotor regulation were suspected but never before established.

### Studies on the Secretion of Urine by the Isolated Kidney.

The heart-lung preparation affords a means by which any isolated organ may be fed with arterial blood of known composition at any desired pressure, rate of flow, and temperature. It is thus possible to study the functions of an organ apart from nervous influences and from the chemical influences which may arise in consequence of modifications in the blood caused by other organs of the body. After numerous attempts Starling and Verney succeeded in maintaining the isolated kidney in such a condition that it would secrete abundant urine.

By this method, which demands extraordinary experimental skill, Starling has opened a new chapter on the physiology of renal secretion. Already many new facts, and others which were previously only matters of surmise, have been discovered and established. His observations with Verney, and in collaboration with Eichholz, have shown that the glomeruli filter from the blood plasma its non-protein constituents, and that by using hydrocyanic acid to suspend tubular activity, a pure glomerular filtrate is obtained from the ureter. Also, that whilst urea and sulphate are secreted by the tubule cells, water, chloride, bicarbonate, and glucose are reabsorbed by the tubule cells from the glomerular filtrate. Pituitrin increases the amount of chloride and decreases the amount of water eliminated.

The influence of the pituitary gland upon the secretion of the kidney was particularly studied by his pupils Eichholz and Bruhl. Their experiments suggest that the inability of the isolated kidney to secrete inorganic phosphate is due to the absence of the pituitary hormone. If this be so it is another discovery of a chemical correlation of the body for which Starling is largely responsible.

These researches on the isolated kidney were in full swing in April, when he left for the holiday which was long overdue. They were affording most important results, and doubtless, had he been spared to continue them, he would, with his unrivalled experimental skill, ultimately have succeeded in clarifying our knowledge of urinary secretion, as he discovered the principles involved in the self-adjustments of the heart to physiological requirements.

### Starling as a Teacher.

Starling was a fine teacher. He had not a natural gift of oratory, but, by practice, he early became a good, coherent, and agreeable speaker. He had a happy way of finding telling phrases to emphasize the main points of his discourse, and sometimes, when feeling deeply, he was eloquent. His enthusiasm was infectious, and his pupils enjoyed his lectures.

His influence as a teacher was, however, not confined to those who had the privilege of sitting at his feet. His *Principles of Human Physiology* is the best textbook on the subject in the English language, and is widely used by students on both sides of the Atlantic. It has also been translated into Spanish.

As a teacher to research students he was ideal. He loved the companionship of young men. To everyone, provided only that he were a serious inquirer after truth, he was ready to extend help, encouragement, and friendship.

An account of Starling's scientific career would be incomplete without allusion to the part played in it by his wife. In 1891 he married Florence Wooldridge, the daughter of Sir Edward Sieveking, M.D. They were inseparable companions. With unselfish devotion she helped him more than will ever be known. They discussed all his projects together, and for many years she performed for him all the functions of an efficient secretary. Further, in addition to the responsibilities of bringing up their four children, she bore on her shoulders the burden of the humdrum duties of his life, thus releasing the more energy for his work.

Starling was the recipient of many academic honours. Honorary degrees were conferred upon him by the Universities of Dublin, Sheffield, Cambridge, Breslau, and Heidelberg, and he was a foreign member of several learned societies. He received the Baly Medal in 1907 and the Royal Medal of the Royal Society in 1913.

What place amongst the great discoverers in medical science should be allotted to Starling must be left to the judgement of posterity, but it will be generally conceded by his contemporaries that he was one of the foremost physiologists of our time and that no one since Harvey has so greatly advanced our knowledge of the action of the heart.

Although no man gave more devoted service to science, his interests were many-sided. He loved music, he loved beauty, he loved a fight; in fact, he loved life. The great charm of his companionship was, in part, due to his extraordinary mental alertness and boyish enthusiasm; like Peter Pan, he refused to grow old. His death means a sad loss to all of us, and will be felt not least by the generations of pupils who have been his companions during his life-long search for new knowledge by experiment.

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As mentioned above, Starling was awarded a research scholarship by the British Medical Association at a critical period of his career; the subject he undertook to investigate was "Intracardiac pressure and the origin of the secondary waves on the pulse curve and the causation of morbid changes in the pulse curve." In the previous year he had received a grant in aid of a research on the reaction of degeneration, but did not use it, having been associated with Bayliss in a research on the mode of contraction of the mammalian heart, for which the former had received a grant. A report of this research was published in the BRITISH MEDICAL JOURNAL of July 25th, 1891. It is interesting to note that this grant was intended to cover also an inquiry into the nervous supply of the pancreas, and its relation to diabetes. Starling was a member of the Scientific Grants Committee from 1902 to 1906, and afterwards acted as inspector for the Science Committee of the work of the research scholars and recipients of grants for the London district. He was a member of the Research and Laboratory Workers Subcommittee of the Science Committee from 1919 to 1921. He was secretary of the Section of Physiology at the Annual Meeting in London in 1895, and president of the same Section at the Annual Meeting in Sheffield in 1908.

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A memorial service was held at St. James's, Piccadilly, on May 6th. Among those present were Sir Charles Sherrington, Sir J. H. Parsons, Dr. H. H. Dale, representing the Royal Society; Sir James Fowler, representing the trustees and Advisory Board of the Beit Fellowships; Sir John Rose Bradford, vice-chairman of University College; Dr. A. M. H. Gray, Dean of University College Hospital Medical School; Professor C. A. Lovatt Evans,

the present occupant of the Jodrell chair of physiology at University College; Professor J. Barcroft, representing the Cambridge School of Physiology and the Chemical Welfare Committee of the War Office, and Dr. C. J. Martin, Director of the Lister Institute. Many students from University College were present.

## SOME TRIBUTES.

Sir EDWARD SHARPEY-SCHAFER, F.R.S., Professor of Physiology in the University of Edinburgh, has responded to our request by sending us the following appreciation.

I first became acquainted with Ernest Starling when he came to University College to attend my advanced course in preparation for the physiology of the first M.B. of the University of London, the facilities for such instruction at Guy's Hospital—where he was studying physiology under Wooldridge—not having at that time become developed. It was at University College that he made the acquaintance of William Bayliss, who was working in the laboratory at the electrical changes in secreting glands and on the depressor nerve, and who subsequently joined Starling in a series of investigations on the electro-physiology of the heart and on the mechanism of secretion, which culminated in the discovery of secretin and the promulgation of the doctrine of chemical messengers, which has done so much for the advancement of modern physiology and has had so important a bearing upon clinical medicine. This investigation was conducted at Guy's Hospital, where Starling had succeeded Wooldridge in the teaching of physiology.

Like everybody else I was struck from the first by his originality and force of character, and when I transferred to Edinburgh in 1899 it seemed clear that there was no one so well qualified to occupy the position vacated at University College. This, at any rate, was the view taken by the Committee of the Senate to whom the selection of my successor was entrusted, and it soon appeared that no better selection could have been made. Starling was not only an enthusiastic worker but an inspiring teacher. His influence was felt at University College far beyond the range of his own subject. He had not occupied the chair many years before he succeeded in raising a large enough sum of money to build the present institute, which is well equipped for carrying on both teaching and research in all branches of physiology. This took the place of the old department, which occupied the upper floor of the north wing, and which had itself succeeded a laboratory of three rooms—one of them a cellar—which had been placed at the disposal of my predecessor, Professor Burdon-Sanderson, when he succeeded Michael Foster as professor of practical physiology in 1870.

Ever since I came to know Ernest Starling we have kept in close touch with one another, and no one could know him without appreciating his energy, loyalty, and sympathy. Although British physiology has sustained grievous losses of late years by the death of William Bayliss, Augustus Waller, Frederick Mott, and John Newport Langley, no loss will be more felt than that of Ernest Starling; and this feeling will not be confined to our own countrymen, but will certainly be shared by our colleagues belonging to all other nations.

Sir CHARLES SHERRINGTON, O.M., F.R.S., Waynflete Professor of Physiology in the University of Oxford, has sent us the following:

The death of Professor Starling is a grievous loss to British physiology. The debt which our science owes to him is systematically set forth in the full notice which appears of him in this issue of the JOURNAL. But even the briefest references to it cannot fail to remark that in addition to the splendid set of researches on the circulation which he gave to his science he contributed also to its ways and means for further inquiry, and other and future hands will benefit from the conspicuous labour he gave towards securing financial support for laboratory and personnel. University College, London, especially can bear witness to this part of his achievement. Indeed, a leading "*motif*" throughout Starling's life was his devotion to the progress of that college, with which for so long his activity was connected.

One of my earlier personal recollections of Starling goes back to a time when we both of us were teaching physiology in London, and on the arrival of the summer vacation took our holiday together climbing in Switzerland. His enthusiasm for the hills and mountains was immense, and he was a good "goer"; he made one of the most excellent and enjoyable of companions. At that time he spoke not rarely of a desire to make his career in experimental pathology. Medicine was certainly his source of inspiration then, and I think it always remained so.

The long and intimate association with Bayliss rises to mind as one of the most fruitful and attractive of scientific collaborations of their period. Part of its strength lay in the two men being in not a few ways of complemental quality one to the other. For instance, a resolute but placid enthusiasm of the one met a high-tension and impetuous enthusiasm of the other; and again, the one without, the other with, full formal medical training. And both reinforced each other's enthusiasm, for both had the power of strikingly transmitting their enthusiasm to others. Starling's death leaves a void which those who knew him realize best cannot be filled.

Dr. H. H. DALE, Secretary of the Royal Society and Head of the Department of Biochemistry at the National Research Institute, Hampstead, has answered our request for a tribute by sending us this glowing picture:

Physiologists all over the world will mourn the loss which Starling's untimely death brings to their science, and to many it will further mean the breaking of warm personal friendship. Here, in the British circle, where many had been his pupils and co-workers, and all had found in him a loyal and generous comrade and leader, it is impossible to think of physiology in the past thirty years without Starling as a central figure of inspiration. The advance of physiology was to him the thing of supreme importance in life, worthy of the utmost that he could give of his skill and of his overflowing energy of mind and body. The war, with its diversion of normal aims, seemed for a time to have done what no threat of exhaustion could achieve, and to have dimmed the fire of this great enthusiasm of his life. It soon flamed high again, though he was threatened by physical disaster such as, for most men, would have meant the end of all but a restrained activity. Starling's courage was indomitable; his energy and his passion for knowledge flouted all restraint. When in 1923 he accepted the newly founded Foulerton Research Professorship of the Royal Society, it was hoped that freedom from the burdens of formal teaching and administration would give him a full decade of quiet and unhampered work in his own field of research. He threw himself eagerly into a series of brilliantly conceived but exacting investigations. These four years of fruitful work, with a succession of able pupils and collaborators from this and other countries, gave him the old joy of achievement, but must have imposed an increasing physical strain, such as only his wonderful courage could ignore. To have worn himself out in the service of the science which he loved, and then to go quietly from the scene, was an end, one must think, not far from his own ideal. For those who remain it is difficult to think of a future lacking the stimulus of his intense vitality and generous enthusiasm.

To Professor J. B. LEATHES, F.R.S., Professor of Physiology in the University of Sheffield, we are indebted for the following striking tribute to Starling's qualities:

Starling's love for the science to which he devoted his life was such that he regarded all who were in its service as his friends. His death is a loss they all must feel, no less deeply for what it is to them personally than for the end thus set to the extraordinary fruitfulness of his devotion to physiology. Those who had the privilege of association with him from the early days of his career one and all know this. But it remained true to the end; he did not change. In any society of men it is rare indeed

for members to identify themselves so completely with it as Starling did with the Physiological Society. For more than thirty years he was at its heart as it always was at his. Among those who knew Starling as a teacher, even in the years before he was 30, there must be many who still feel the power of his enthusiasm. The vivid light that he could concentrate on facts meet for reflection made difficulties glow with meaning. When a teacher can make his pupils feel that his whole life and being reinforces his intellect in its assault on the obstacles to understanding, he will have followers. He had many, who will to the end draw much of their best inspiration from the memory of what he was to them in the days when it all came from him. This is his legacy to physiology. His companionship, exhilarating to look forward to, will now be always exhilarating to remember, like the sun and air in the high Alps, where it was best of all. There to see the way he set about the day's work was good, partly because it was the same as the way he set about an experiment—the same eagerness and zest, the same forethought and attention to detail. When he could take a holiday it was to the Alps that his thoughts turned; from whatever was irksome in a busy life it was in his experiments that he found relief.

We have received this tribute from Professor ELLIOT SMITH, F.R.S.; it is dated from the Institute of Anatomy, University College—a building under the same roof as the Institute of Physiology—and is most appropriate, for no one better than Starling appreciated the value of the close working together of anatomy and physiology:

Others have written with fuller knowledge and competence of Starling's vast influence in the progress of physiology, of his superb skill as an experimenter, and of his happy association with Bayliss in providing new and fruitful conceptions of the essential phenomena of living processes. Every field of investigation that he cultivated was enriched, not only by additions to our information, but also with new methods of study and stimulating suggestions. Starling was not one of those who devote themselves to a select band of followers. His influence was world-wide; and it was physiologists in general and not simply a group of disciples who enjoyed the fruits of his labours and the inspiration of his help and guidance. A quarter of a century ago Starling foresaw that with the increase of specialization and the development of new departments of knowledge there was a danger of the medical sciences becoming separated and so losing that intimate correlation which is essential for real progress. Hence he set to work to design a scheme which would keep all these sciences in close touch with one another and promote the integration of all by permitting readjustments of the boundaries of the different departments to meet new circumstances and provide better co-operation. He was largely responsible for collecting the money to erect his Institute of Physiology, and later, in extending this building, to make provision for pharmacology and biochemistry. These achievements were the chief factors in attracting the attention of the Rockefeller Foundation to University College. Their gift enabled the College to complete Starling's original scheme and to create an object lesson in co-operation between the medical sciences, which is already exercising an influence throughout the world.

Although Starling regarded physiology as the chief instrument in the search for truth, and was very frank and outspoken in expressing his opinions on other departments of biology and medicine, he was an easy man to work with and a delightful colleague. He was so honest and courageous that while he bluntly said what he really thought, he was ready to accept equal frankness from his colleagues without resentment. He was intensely loyal to the College to which he gave the best years of his life, and had a firm faith in the greatness of its destiny.

### UNIVERSITY COLLEGE.

At a General Assembly of the staff and students of University College and University College Hospital on May 5th, the following resolution, moved by the Dean of the Faculty of Medical Sciences, Professor G. Elliot Smith, F.R.S., and seconded by the Dean of University College Hospital Medical School, Dr. A. M. H. Gray, was unanimously adopted:

> That this assembly of the staff and students of University College and University College Hospital desire to express their sorrow and deep regret at the death of Professor Ernest Henry Starling, formerly Jodrell Professor of Physiology in the College.
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> In doing so they wish to record their high appreciation of his loyalty and devotion to the College, and of his conspicuous services to the advancement of knowledge and scientific method.
>
> Among his many services they recall the high distinction he conferred upon the College by researches in many departments of physiology, which were not only important additions to our knowledge, but also bold adventures that stimulated research in the widest fields of biology, and provided new and fruitful conceptions of the essential phenomena of life. They recall also his great conception for the more intimate co-operation of teaching and research in all departments of the medical sciences, which, largely as a result of his own efforts, he was able to see realized in this College. But above all his enthusiasm in the search for truth, and his courage and honesty in giving frank expression to what he believed, conferred upon him a powerful influence in the College, which he always served with conspicuous loyalty and faith in the greatness of its destiny. He endeared himself to his colleagues and students by his boldness in doing what he thought was right.
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> This assembly desires to convey to Mrs. Starling and the members of his family their respectful sympathy in the great sorrow that has fallen upon them.

## Universities and Colleges.

### UNIVERSITY OF LONDON.

#### ACQUISITION OF THE BLOOMSBURY SITE.

THE University of London has been enabled to acquire the site in Bloomsbury to the north of the British Museum originally bought for it by the Government in 1920. It may, we think, be assumed that the decision is final, for the Duke of Bedford has agreed, and the Senate of the University was unanimous in accepting the offer.

The announcement was made by the President of the Board of Education at the Presentation Day dinner on May 11th in the following terms:

> During the past few months, with the promise of a limited Government grant, the University of London has been negotiating with the Duke of Bedford and his trustees for the purchase for University purposes of part or the whole of what is known as the University site in Bloomsbury. These negotiations have now ended in agreement on essentials and, though the formal contract has still to be completed, it can be stated that the Duke has agreed to sell the whole site to the University, and that the University is in a position to buy it and has decided to do so. This purchase by the University has been made possible partly by the use of a limited grant promised to the University by the Chancellor of the Exchequer last July, and partly by a munificent contribution from the Rockefeller Foundation.

Lord Eustace Percy added that the announcement marked a great and historic moment in the history of the University of London, for the selection of its home was something more than a mere question of geography. The task now was to establish a university teaching centre worthy not only of the capital city of the United Kingdom, but of the capital of the Empire. The Vice-Chancellor, Sir William Beveridge, said that the choice of the site was now finally and fortunately settled. Although the formal contract was not complete, the site would pass very shortly into the possession of the University and would be irrevocably dedicated to University purposes; it would be the headquarters of the University and the spot from which its further growth would take place; it was in the heart of the capital city of London, and in the midst of the great teaching colleges in Bloomsbury. There were now in this district seven or eight colleges, forming a university larger than Cambridge, the next largest of the universities in the British Isles. They were grouped round the British Museum and the empty space north of the Museum which the University had now acquired. The University headquarters were still to make, and on this site of 8½ acres there would, he foresaw, presently be erected a central office, a senate house, a library, a ceremonial hall, examination halls, together with the Institute of Historical Research, a faculty club for teachers, a students' union, a centre for students' activities—and, above all, for hospitality to overseas students—headquarters for the O.T.C., perhaps two or more colleges, and, finally, the beginning of residential quarters, both for teachers and

students. At present the money in hand was only sufficient to build a central office, but as money became available it would be possible to erect on that open tree-bounded space something of beauty, to be a common possession and a common pride for all. A visitor to one of the ancient universities could not fail to feel how much of their influence was due to the sheer beauty with which they surrounded the young men and women that went to them. In London it would not be possible to do quite the same, but there could be built on the site something as unique and characteristic of London and the new arts and materials of modern building as the buildings of the old universities were characteristic of their time. He hoped that the University would have the means to seek and the luck to find an inspired artist who could embody the ideal in stone and steel. It ought to be possible to bring into the heart of London a group of buildings which, with their towers and pinnacles rising to the sky, would form a shrine of youth and learning in Bloomsbury to rank with the shrine of our history and our liberties by the Thames at Westminster.

The site covers 11½ acres, including roads; it is bounded on the south side by the British Museum, on the west by Malet Street, where the Imperial College of Hygiene and Tropical Medicine is being built; on the north by Gordon Square, and on the east by Woburn Square, Upper Montague Street, and Russell Square; it is almost within sight of the House of the British Medical Association.

*Presentation Day.*

The annual presentation of degrees took place on May 11th in the Albert Hall, South Kensington; 2,700 degrees were conferred, and in addition 550 diplomas, certificates, and prizes were awarded.

*Annual Report of the Principal Officer.*

Mr. T. Franklin Sibly, D.Sc., who has succeeded Sir Cooper Perry as principal officer of the University of London, states in his annual report on the work of the University during 1926-27 that the total admissions by all channels numbered 7,668, as compared with 7,577 in the previous year, and 3,852 in the last year before the war. The great majority (5,407) of the entrants came in through the matriculation examination. There were 3,967 candidates for degrees, as compared with 3,819 in 1925; the number who attained degrees and diplomas was 3,173, as compared with 2,908 last year. The roll of internal students now comprises 9,342 names; there were 9,323 in 1925.

During the year under review the London County Council increased its annual grant for the current triennium to £57,933; it has also undertaken to meet any demands arising during the triennium for the provision of University extension courses in evening institutes up to a limit of expenditure of £600 in any one year. The University has made a non-recurring grant of £1,000 for libraries generally, and a capital grant of £15,000 to Bedford College for building; other applications for capital grants were under consideration. A second donation of £10,000 for engineering studies at University College was made by Lord Cowdray before his death. Sums have been received to endow a Queen Alexandra lectureship in Danish and the Crown Princess Louise lectureship in Swedish; reference is made also to the gift by Lady Godlee of £500 to University College and its medical school for the establishment of a lecture in memory of the late Sir Rickman Godlee. An anonymous gift of £10,000 has been received towards the establishment of a chair of dietetics, and £180,000 has been presented by the trustees of the Laura Spelman Rockefeller Memorial to the London School of Economics for general endowment and capital expenditure.

The Cancer Hospital has been admitted as a school of the University for a period of three years. The visitation of schools of the University is being continued, and during the year reports of inspectors were received with regard to University College, King's College, King's College for Women, Household and Social Science Department, and East London College. It is stated that the Senate is prepared to consider any scheme for co-operation between training colleges and the University.

In concluding his report Dr. T. Franklin Sibly refers to the transition nature of the year now commencing. The problem of the provision of a dignified home for the University has been earnestly debated and is, he thinks, approaching complete solution.

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ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.

A QUARTERLY meeting of the Royal College of Physicians of Edinburgh was held on May 3rd, when Dr. G. M. Robertson, president, was in the chair.

Dr. John Robert Lord, C.B.E., and Dr. William Bell were introduced and took their seats as Fellows of the College. Dr. Walter Duncanson Chambers was elected a Fellow of the College.

The following were elected members of the College: Arthur Mills, Harold E. Whittingham, Ram S. Gupta, James Davidson, James A. L. Loudon, William L. Kinnear, and Raymond L. A. Kitchen.

Dr. R. A. Fleming was nominated a representative on the Conjoint Committee of Management of the Triple Qualification.

The Parkin prize was awarded to Dr. John D. Comrie.

The Freeland Barbour Fellowship was awarded to Dr. Thomas R. R. Todd.

## The Services.

ROYAL ARMY MEDICAL CORPS WAR MEMORIAL.

THE service of dedication of the stained glass window, which completes the Royal Army Medical Corps War Memorial in Westminster Abbey, will take place on Sunday, May 22nd, at 4.15 p.m., in the Nave. Tickets of admission are not required for the service, but subscribers to the Memorial Fund and others interested desiring reserved seats for the 3 o'clock evensong preceding it should apply by letter to Major-General H. B. Fawcus, C.M.G., D.S.O., Room 313, War Office, Whitehall, S.W.1. Uniform need not be worn at the service of dedication.

## Medical News.

THE next session of the General Medical Council will begin on Tuesday, May 24th; the President, Sir Donald MacAlister, Bt., K.C.B., M.D., will give an address at 2 p.m.

A MEETING of the Maternity and Child Welfare Group of the Society of Medical Officers of Health will be held at the Shoreditch Model Welfare Centre, 210, Kingsland Road, on Wednesday, May 18th, at 4.30 p.m., when cases will be shown by the medical officers of the Shoreditch Maternity and Child Welfare Department, and when a paper entitled "The Newcastle-upon-Tyne caloric percentage method of dieting the premature and the sick infant" will be read by Dr. Glen Davison at 5.45 p.m. The centre is passed by buses Nos. 22, 35, and 69 from Liverpool Street.

AT a sessional meeting of the Royal Sanitary Institute to be held at the Guildhall, Bath, on Friday, May 20th, at 7.30 p.m., a discussion on cremation will be opened by Mr. H. T. Herring, M.B., B.S., honorary secretary of the Cremation Society of England, and continued by Dr. Preston King, chairman of the Bath Health Committee. On the morning of the following day (Saturday, May 21st), after a paper on sewage disposal by Mr. E. P. Sissons, engineer of Bath, a visit will be paid to the Bath City Sewage Disposal Works.

A DISCUSSION on swimming baths will take place at a meeting of the Medical Officers of Schools Association at the house of the Medical Society of London (11, Chandos Street, Cavendish Square, W.1) on Friday, May 20th, at 5 p.m. The discussion will be opened by Dr. F. Graham Forbes, Divisional Medical Officer, Public Health Department, London County Council, Dr. F. W. Alexander, late medical officer of health for Poplar, and Mr. F. E. Wilkinson, engineer and surveyor, Willesden Urban District Council.

THE bi-annual dinner of the Aberdeen University Club, London, is to be held on Thursday, May 26th, at the Piccadilly Hotel, at 7.30 p.m. The Lord Rector, Viscount Cecil of Chelwood, will be in the chair, and the guest of honour will be Mr. John Buchan, LL.D., M.P. Any Aberdeen University graduates, past or present, men or women, wishing to join the club or attend the dinner are asked to communicate with Dr. Anstruther Milligan, 11, Upper Brook Street, W.1.

THE annual medical missionary breakfast of the Medical Prayer Union will be held on Wednesday, May 18th, at the Refectory, University College, Gower Street, W.C.1, at 8 a.m., under the presidency of Dame Mary Scharlieb, D.B.E., M.D., M.S. An address will be given by Dr. Katherine Harbord of Jaunpur, India. An intimation of intention to be present will be welcomed by the honorary secretary, Dr. Tom Jays, Livingstone College, Leyton, E.10.

MR. WALTER G. SPENCER has been elected to the Senate of the University of London.

THE annual Nettleship prize has this year been awarded by the Ophthalmological Society of the United Kingdom to Mr. Charles H. Usher, M.B., B.Ch.Camb., F.R.C.S.Edin., ophthalmic surgeon to the Royal Infirmary, Aberdeen.

THE practice of the National Hospital for Diseases of the Heart is now open to students who have completed four years of medical study, and short courses of instruction in cardiology will be held immediately preceding the final examinations. Particulars may be obtained from the Secretary of the Hospital, Westmoreland Street, London, W.1.

THE trustees of the Carnegie Hero Fund have awarded an annual grant of £120 to Dr. G. C. W. Williams, who was engaged in *x*-ray treatment from 1895 to 1926. Dr. Williams contracted dermatitis as a result of his work, and after eight operations, which included the amputation of the right hand and the loss of two fingers of the left, has been rendered almost helpless.

THE Fellowship of Medicine announces that demonstrations will be given by Dr. B. T. Parsons-Smith at the National Hospital for Diseases of the Heart, on May 17th, at 10 a.m.; by Mr. Maurice Whiting, at the Royal London Ophthalmic Hospital, on May 19th, at 1 p.m.; by Mr. Maynard Smith, at St. Mary's Hospital, on May 20th, at 2 p.m. These demonstrations are free to medical practitioners. From May 16th to 28th a special course will be held at the Infants Hospital, and there will be a late afternoon course at the Hampstead General Hospital for two weeks from May 16th. A ten weeks' course in neurology began on May 9th at the National Hospital, Queen Square. The Fellowship of Medicine can arrange for practical courses in anaesthetics and obstetrics, and for clinical assistantships in gynaecology. During June special courses will be held in diseases of the chest at the Victoria Park Hospital, in diseases of children at the Children's Clinic, in gynaecology at the Chelsea Hospital, and in ophthalmology at the Central London Ophthalmic Hospital. The Fellowship provides also a general course of instruction at the associated hospitals. Copies of all syllabuses and of the *Post-Graduate Medical Journal* may be obtained from the Secretary of the Fellowship, 1, Wimpole Street, W.1.

A SERIES of lectures and counter-lectures in aid of King Edward's Hospital Fund for London is being held during May and June in the Great Hall of the London School of Economics, Houghton Street, Aldwych, on Tuesdays, at 5.30 p.m. Tickets may be obtained from the British Charities Association, 103, Kingsway, W.C.2. The subjects are varied, but their irresponsible character may be gathered if we mention that the last debate of the series, on Tuesday, June 21st, will be between Mr. G. K. Chesterton and Mr. Mitchell Banks, K.C., M.P., with Miss Rose Macaulay in the chair, the subject being "Is the House of Commons any use?"

A COURSE of four consecutive week-end demonstrations will be given at St. Bartholomew's Hospital during June and July, commencing at 5 p.m., on Friday afternoons, and terminating on Saturday evenings. On June 17th and 18th the subject will be modern methods in the diagnosis and treatment of chronic diseases of the lungs, and the following week-end will be devoted to the treatment of the common fractures of general practice. The diagnosis and treatment of chronic renal disease will be considered on July 1st and 2nd, and ante-natal methods will be dealt with on July 8th and 9th. The fee for each week-end is one guinea, or four guineas for the course. Further information may be obtained from the Dean, St. Bartholomew's Hospital, E.C.

# Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the BRITISH MEDICAL JOURNAL alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the BRITISH MEDICAL JOURNAL must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the JOURNAL, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the BRITISH MEDICAL JOURNAL are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

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The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 4361 Central).

## QUERIES AND ANSWERS.

A BRITISH medical man, aged 62, resident abroad, has a blood pressure of 170 to 200, and suffers from daily attacks of pain, beginning over the centre of the sternum, spreading to both sides of the neck and head, and down both arms. It is worse after food or any little excitement. He asks for advice.

### FACIAL SPASM IN A CHILD.

"A. G." asks for suggestions in regard to treatment and prognosis in the following case: A boy, aged 5 years, has developed a facial habit-spasm. He frequently draws up his nose and winks the eye at the same time on the side affected. Adenoids were removed some time ago, and his teeth were damaged at the time of the operation. He has been troubled with enuresis, which is practically cured. Otherwise he is healthy and is very quick at learning.

### ASPIRIN AND POTASSIUM CITRATE.

DR. BRODRIBB (Penmaenmawr), having observed that aspirin dissolves freely when prescribed together with potassium citrate, inquires whether the dissolution implies a chemical change in the drug and consequent modification of its therapeutic value.

*** The solution of aspirin by potassium citrate is unaccompanied by any chemical reaction, and there is accordingly no change in the nature of its physiological action. But although its chemical identity is preserved, there may be a notable difference in the therapeutic effects, for apart from the independent action of the potassium citrate, the speed and even the locus of absorption may be altered. It is said that aspirin passes through the stomach unchanged, but is slowly decomposed by the alkali of the duodenum, with liberation of salicylic acid. It would accordingly seem that its dissolution in potassium citrate would result in a larger absorption by the stomach and less being carried forward to the duodenum.

### INCOME TAX.

*Partnership Assessments.*

A and B were equal partners in a practice until June 1st, 1926, when A's share was transferred to C. In whose names should the returns be made and how should the assessment be divided?

*** The return should be made by "A and B and successors B and C." In dividing the liability it should be borne in mind that it is the *gross* assessment—that is, the amount assessed before any personal allowances are deducted—that serves as the basis of the division. The shares of the gross assessment attributable to each partner will be as follows—A $\frac{1}{2}$, B $\frac{1}{2}$, and C $\frac{1}{2}$; from these shares the full amount of the personal allowances due to each partner should be deducted. Thus if the amount of the assessable earnings less professional expenses is £3,200, A will be liable to tax on £400 less the £225 personal allowance and any others to which he may be entitled.

## LETTERS, NOTES, ETC.

### VITAL-STATISTICAL FACTS NOT GENERALLY RECOGNIZED.

DR. B. DUNLOP (London, S.W.) writes: It is stated in your issue of May 7th (p. 850) that "although some seventy thousand more babies were born in France than in England and Wales in 1926, the excess is reduced to little more than twenty-six thousand if account is taken of the higher rate of infant mortality across the Channel." The French rate was 83 and ours was 70, and 765,226 *minus* $\frac{1}{1000}$ of 766,226 exceeds 694,897 *minus* $\frac{1}{1000}$ of 694,871 by more than twice "twenty-six thousand." The slip or misprint is unfortunate, because people should know that the French death rate is only slightly excessive among the infants, but is slightly excessive also among the rest of the population. This suggests that the population is still pressing on its food supply and that there will be no further decline of the general death rate unless there be a further reduction of the birth rate.

### EARLY PARENTHOOD.

DR. A. R. RENDLE (Godalming) writes: Docteur Cabanès, in his book *Le sixième Sens*, quotes the case of childbirth in a girl aged 13, of another case in which the mother was aged 12, and of another case, occurring in Paris in 1756, in which the mother was 9½ years old.

### FOREIGN BODY IN RECTUM.

"R. B. G." writes: I can add a third case to the two recent notes. An old friend (of my college days), who sent for me while on a visit to the neighbourhood many years ago, complained of a constant desire to defaecate, with slight melaena. On examination I felt a hard, longish, thin substance lying across the exit, which, on removal, not without difficulty and pain, turned out to be a codfish bone. On informing him he said that he had partaken of a fish supper two nights previously.

### VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 41, 42, 43, 46, and 47 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 44 and 45.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *203*.

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